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THE 1986 AIBS BRYOLOGICAL AND LICHENOLOGICAL FORAY

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The foray sponsored by the American Bryological and Lichenological Society for the 37th AIBS Annual Meeting was held in southern Vermont on August 9-10, 1986. Cyrus B. McQueen was responsible for the organization of the foray, which was based at Mt. Ascutney State Park near Ascutney, Vermont. The diverse group of approximately 40 bryologists and lichenologists came from Arizona, Connecticut, Georgia, Illinois, Iowa, Maryland, Maine, Michigan, Newfoundland, New Hampshire, New Jersey, New York, North Carolina, Ontario, Quebec and Utah.

The foray began on Saturday morning by climbing Mt. Ascutney, which rises to 3150 feet and is one of the most distinctive landmarks in the state. This mountain is considered to be a monadnock, formed from the erosion of land around it, distinguishing it from the Green Mountains surrounding it which were formed from upthrusting of the earth's crust. The participants split into many groups and hiked up many different trails to the summit. Bryophytes collected and identified along the trails to the summit included *Andreaea rupestris*, *Bazzania trilobata*, *Bryhnia novae-angliae*, *Dicranum scoparium*, *D. fulvum*, *Diphyscium foliosum*, *Drepanocladus fluitans*, *Hypnum fertile*, *Jamesoniella autumnalis*, *Paraleucobryum longifolium*, *Plagiothecium cavifolium*, *P. laetum*, *Pleurozium schreberi*, *Plagiochila porelloides*, *Pogonatum alpinum*, *Pohlia nutans*, *Polytrichum pallidisetum*, *P. commune*, *Ptilidium ciliare*, *P. pulcherrimum*, *Ptilium crista-castrensis*, *Racomitrium aciculare*, *R. heterostichum*, *Rhabdoweisia crispata*, *Thamnobryum alleghiense* and *Ulota crispa*. These species are representative of bryophytes found throughout the Green Mountains. A list of lichens found on Mt. Ascutney and the other sites is presented at the end of this article due to its length and since the lichen flora of Vermont is not well-known due to the paucity of collections in herbaria and published floras.

Those reaching the summit in the early afternoon were greeted by thunder and lightning and made a quick retreat down the toll road. The rocky summit was found to be covered with spruce and scattered mats of *Sphagnum*. The species found included *S. angustifolium*, *S. capillifolium*, *S. fallax*, *S. girgensohnii*, *S. russowii* and *S. subtile*. All these species are very common throughout the Green Mountains.

On Sunday the participants explored Quechee Gorge near Quechee, Vermont. In spite of the nearly vertical 140 ft. walls, the participants soon discovered trails that permitted access to the cliff faces. Some of the bryophytes identified in the gorge included *Anomodon attenuatus*, *Encalypta procera*, *Fissidens dubius*, *Frullania eboracensis*, *Grimmia alpicola*, *Lophocolea minor*, *Metzgeria conjugata*, *M. furcata*, *Mnium thomsonii*, *Myurella sibirica*, *Plagiochila porelloides*, *Pogonatum alpinum*, *Preissia quadrata*, *Pterigynandrum filiforme*, *Scapania nemorosa* and *Thamnobryum alleghaniense*. Many different liverworts were observed on the damp walls of the gorge, but unfortunately only a few were recognized in the field since there were not any field hepaticologists on the foray. A detailed examination of the gorge would undoubtedly turn up new species of liverworts for the state (McQueen, 1986). The lichenologists found the lichens especially interesting and were reluctant to leave the gorge for the next site.

The final site of the foray was at Hartland Bog near Woodstock, Vermont. The bryophytes found at Hartland Bog indicate that its name is misleading because some of the species found there are indicative of rich fens. These include *Sphagnum fimbriatum*, *S. magellanicum*, *S. teres*, *S. warnstorfii* and *Tomenthypnum nitens*. Additional bryophytes identified at Hartland Bog included *Aulacomnium palustre*, *Brachythecium rivulare*, *Callicladium haldanianum*, *Calliergon giganteum*, *Calliergonella cuspidata*, *Calypogeia muelleriana*, *Campylium stellatum*, *Climacium dendroides*, *Dicranum scoparium*, *D. fulvum*, *Enclaypta ciliata*, *Fissidens adianthoides*, *Helodium blandowii*, *Leucobryum glaucum*, *Mnium punctatum*, *Philonotis fontana*, *Plagiopus oederiana*, *Rhizomnium appalachianum*, *Sphagnum fuscum*, *S. capillifolium* var. *tenellum*, *S. subtile*, *Thuidium delicatulum*, *T. recognitum*, *Ulota crispa* and *U. hutchinsiae*.

Lichens Collected on the 1986 ABLS Foray

Collection sites: The collecting sites are described immediately below and coded by number, which are cited in the species list.

1. Mt. Ascutney, Windsor Co., 43°25'N, 72°28'W
2. Quechee Gorge, Windsor Co., 43°45'N, 72°27'W
3. Hartland Bog, Windsor Co., 43°32'N, 72°32'W

Anaptychia palmatula (Michx.) Vain.: 1, Schmitt 5416.
Arthopyrenia sp.: 3, Brodo 25470.
Aspicilia verrucigera Hue: 1, Brodo 25454.
Baeomyces rufus (Huds.) Rebent.: 1, Brodo 25452.
Buellia stillingiana Steiner: 3, Brodo 25469.
Calicium trabinellum (Ach.) Ach.: 1, Brodo 25437.
Cetraria oakesiana Tuck.: 1, Brodo 25440, Schmitt 5407.
Cetrelia chicitae (W. Culb.) W. Culb. & C. Culb.: 1, Brodo 25450, Schmitt 5415.
Cladonia bacillaris Nyl.: 1, Brodo 25435, Schmitt 5409.
C. crispata (Ach.) Flot.: 1, Schmitt 5420.
C. cristatella Tuck.: 1, Schmitt 5410.
C. deformis (L.) Hoffm.: 1, Schmitt 5403.
C. pleurota (Flörke) Schaer.: 2, Schmitt 5429.
C. uncialis (L.) Wigg.: 1, Schmitt 5402.
Dermatocarpon miniatum (L.) Mann: 1, Schmitt 5401.
Evernia mesomorpha Nyl.: 1, Schmitt 5406.
Hypogymnia krogiae Ohlsson: 1, Brodo 25439, Schmitt 5408.
H. physodes (L.) Nyl.: 1, Schmitt 5417.
Ionaspis epulotica (Ach.) Blomb. & Forss.: 2, Brodo 25466.
Lasalia papulosa (Ach.) Llano: 1, Schmitt 5400.
Lecanora caesiorubella Ach. spp. *caesiorubella*: 3, Brodo 25477.
L. glabrata (Ach.) Malme: 3, Brodo 25476, Schmitt 5430.
L. hybocarpa (Tuck.) Brodo: 3, Brodo 25475.
L. thysanophora R. C. Harris, ined.: 3, Schmitt 5431.
Lepraria membranacea auct.: 1, Brodo 25444.
L. zonata Brodo: 1, Brodo 25436, Schmitt 5404.
Melanelia subaurifera (Nyl.) Essl.: 3, Schmitt 5432.
Micarea prasina Fr.: 1, Brodo 25443.
Pannaria leucophaea (Vahl) P. M. Jørg.: 2, Brodo 25459.
Parmelia omphalodes (L.) Ach.: 1, Brodo 25445.
Parmelina aurulenta (Tuck.) Hale: 3, Schmitt 5433.
Parmeliopsis hyperopta (Ach.) Arn.: 1, Schmitt 5412.
Peltigera evansiana Gyel.: 3, Schmitt 5435.
P. praetextata (Flörke ex Somm.) Zopf.: 2, Brodo 25456, Schmitt 5426.
Phaeophyscia adiastola (Essl.) Essl.: 2, Brodo 25457.
Physcia phaea (Tuck.) Thomson: 1, Schmitt 5398.
P. stellaris (L.) Nyl.: 2, Schmitt 5427.

Polyblastiopsis fallaciosa (Stizenb. ex Arn.) Zahlbr.: 3, Brodo 25471.
Porpidia albocaerulescens (Wulf.) Hertel & Knoph: 1, 2, Brodo 25442, 25462; 2, Schmitt 5422.
P. crustulata (Ach.) Hertel & Knoph: 2, Brodo 25467.
Protoblastenia rupestris (Scop.) Steiner: 2, Brodo 25468.
Pseudevernia consocians (Vain.) Hale & Culb.: 1, Schmitt 5413.
Psilolechia lucida (Ach.) Choisy: 1, Brodo 25451.
Punctelia appalachensis (W. Culb.) Krog: 1, Brodo 25449.
P. rudecta (Ach.) Krog: 1, Schmitt 5418.
P. subrudecta (Nyl.) Krog: 3, Brodo 25473, Schmitt 5436.
Ramalina intermedia Nyl.: 1, Schmitt 5414.
Rinodina subminuta Magn.: 3, Brodo 25455.
Scoliciosporum chlorococcum (Stenham.) Vezda: 3, Brodo 25478, Schmitt 5437.
Staurothele diffractella (Nyl.) Tuck.: 3, Brodo 25461.
Stereocaulon pileatum Ach.: 1, Brodo 25453; 2, Schmitt 5421.
Trapelia involuta (Tayl.) Hertel: 1, Brodo 25441.
Trapeliopsis granulosa (Hoffm.) H. T. Lumbsch: 1, Brodo 25434.
Umbilicaria deusta (L.) Baumg.: 1, Schmitt 5399.
Verrucaria aethiobola Wahlenb. in Ach.: 3, Brodo 25466.
V. nigrescentoidea Fink: 1, Brodo 25438.

I would like to acknowledge Dick Andrus, Irwin Brodo, Marc Favreau, François Lutzoni, Allen Risk, Joseph Rohrer, Richard Spjut and William Town for assistance in compiling lists of bryophytes collected on the foray. I am especially thankful to Irwin Brodo (CANL) and Claire Schmitt (NYS), who supplied verified lists of lichens.

McQueen, C. B. 1986. Checklist of Vermont liverworts. Evansia 3: 26-28.

1988 AMERICAN BRYOLOGICAL AND LICHENOLOGICAL SOCIETY FORAY

Bryophytes and lichens of the Coast Ranges: Mendocina and Lake counties, California. Saturday, August 13 through Sunday, August 14, 1988. Cost approximately $25 per person including Saturday night lodging and meals. Participants will meet in Davis on Friday night for an overview of the trip. The group will leave 7:30 am, Saturday morning from the U.C. Davis campus, stay Saturday night at Mendicino Woodlands Camp in Jackson State Forest near the town of Littleriver, and return Sunday evening to the Davis campus. Habitats to be visited include oak woodlands, redwood and Douglas fir forests, coastal bluffs, and cypress and pine pygmy forests. Considerable diversity of mosses, liverworts and lichens will be seen with possibilities for collecting. Trip organizers are David Showers, The Resources Agency, Dept. of Fish and Game, 1416 9th Street, Sacramento, CA 95814, 916/323-6010 and Brent Mishler, Department of Botany, Duke University, Durham, NC 27706, 919/684-3715. All planning to attend should contact Mishler by June 1, 1988; information regarding payment of fee, meeting sites, and maps will be mailed to registrants in June.

CORRECTIONS AND ADDITIONS TO THE FIFTH LICHEN CHECKLIST

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Rather than let changes in the lichen checklist accumulate as I did with the current edition and end up having to insert and change many names without documentation, I plan to publish occasional notes to get them on paper in advance of another edition. The changes noted in this paper result from my errors, others' errors, investigation of type material and new discoveries in the field.

First are errors of commission on my part. For reasons now totally unknown to me I transferred *Lecidea placidensis* Magnusson to *Fuscidea*. In all of my notes on both an isotype at FH and one recently deposited by Josiah Lowe at NY it is clearly referred to *Lecidella*. The error is herewith corrected, *Lecidella placidensis* (Magnusson) R. C. Harris, comb. nov. (*Lecidea placidensis* Magnusson, Acta Horti Gothob. 10: 41. 1936). The correct author citation of *Pyrenula santensis* is (Nyl.) Muell. Arg. and not (Eschw.) Muell. Arg. Second is an error of omission. When reporting *Crocynia pyxinoides* Nyl. as new to North America (Evansia 4: 26. 1987) I did not check to see if *Crocynia gossypina* (Swartz) Massal. was in the list. I have known the species from Florida for 20 years so it did not occur to me that it had not been reported in the literature. It was hastily inserted in proof. Severin Rapp collected it near Sanford, Seminole County, Florida in 1906 (MICH) and I found it in Franklin County, Florida in 1967 (*Harris 1748*, MSC). Alexander Evans collected it in 1925 in Baldwin County, Alabama (NY). Additional material of *Crocynia pyxinoides* was collected in December 1987 in Marion County, Florida (*Harris 21075*, NY). Also *Bulbothrix isidiza* (Nyl.) Hale which was reported in the same paper was collected again, this time in the Okefenokee Swamp, Georgia (*Harris 21132*, NY).

Also in December 1987 I had the opportunity to borrow specimens from the Rapp Herbarium at the Florida State Museum, University of Florida. I thank Dana Griffin, III for his assistance. Examination of an isotype of *Maronea porinoidea* Zahlbr. revealed that it is a *Ramonia* which led to an overlooked note by Vězda (Folia Geobot. Phytotax. 8: 422. 1973.) where he synonymized it with *Ramonia valenzueliana* (Mont.) Stizenb. Currently three species are listed in *Clathroporina*. Examination of Rapp's material allows two of them to be disposed of. *Clathroporina exiguella* Zahlbr. (isotype, FLAS F30032) is *Julella sublactea* (Nyl.) R. C. Harris. *Clathroporina diphloea* Zahlbr., as I had expected from the illustration, is *Laurera megasperma* (Mont.) Riddle (isosyntype, FLAS F29436). This leaves *Clathroporina confinis* Muell. Arg. as the only representative of the genus in North America. *Polyblastiopsis rappii* Zahlbr. (isotype, FLAS F27978) is identical with *Polyblastiopsis geminella* (Nyl.) Zahlbr. which differs from *P. dispora* (Müll. Arg.) Zahlbr. only in having larger spores. *Polyblastiopsis dispora* is tentatively assigned to *Julella* but without making a formal transfer in the checklist. The rationale for not transferring these two species is that I am still uncertain of their taxonomic position. A new genus may be required. It is also possible that the two represent extremes of the same species. A specimen determined by Zahlbruckner as *Didymosphaeria dannenbergii* (Stein) Saccardo turned out to be *Buelliella* minimula (Tuck.) Fink. In the process of making this determination I discovered that Hafellner (Beih. Nova Hedwigia 62: 153. 1979) had considered Buelliella Fink (Lich. fl. U.S. 372. 1935) a nomen nudum. However a Latin diagnosis is provided as a footnote on that page. Thus "ex Hafellner" should be dropped from the author citation of Buelliella, B. minimula and B. trypethelii. Hafellner has effectively lectotypified Buelliella with B. minimula. Lastly a species, that I have wondered for many years why I have never collected it, is explained. Haematomma rappii Zahlbr. [Florida, Seminole County, Sanford, on grape, Nov 1917, Rapp 702 (FLAS F29168)] is a Schismatomma. It does not match anything I know and make the transfer to bring it to the attention of those who might know it. Schismatomma rappi (Zahlbr.) R. C. Harris, comb. nov. (Haematomma rappii Zahlbr., Bryologist 33: 31. 1930). The species at first glance externally resembles Byssoloma leucoblepharum (Nyl.) Vainio which may explain why it has not been recollected or at least why it has not been recognized.

The folowing additions result not only from a brief "vacation" in December 1987 but from reworking some of the undetermined specimens accumulated over a number of years. On the fieldtrips with the ABLS meeting at Highlands, NC in 1981 I collected a sterile Cladonia which I could not place. I have since become well acquainted with the species in the West Indies and South America. It is Cladonia dactylota Tuck. In the sterile state it is distinguished by large, sorediate, recurved squamules containing psoromic acid. The podetia form narrow, smoothly corticate cups which are apically deformed or aborted by masses of farinose soredia. The collection data are, North Carolina, Macon/Jackson Counties: Whiteside Mountain, ca. 5.5 mi E of Highlands, wet cliff along road, 10 Jun 1981, Harris 13762 (NY). The disturbed, rather wet habitat is very similar to those where I have collected it in the neotropics. Its occurrence is not unexpected as many tropical species extend into the Appalachians, i.e., Hypotrachyna spp.

More recently, on the Blomquist Foray in 1987, I collected a small thallus of Hypotrachyna pseudosinuosa (Asahina) Hale. It is recognized by its capitate soralia and by containing protocetraric acid. Again its occurrence is not unexpected as the species is pantropical. North Carolina, Graham County: Joyce Kilmer Memorial Forest, on fallen branch, 3 Oct 1987, Harris 20963 (NY).

A couple of days in the field with Dana Griffin turned up an additional, not so new record: Myriotrema reclusum (Krempelh.) Hale (Florida, Levy County: Cedar Key State Reserve, Black Point Swamp, 7 Dec 1987, Harris 21023, NY). Hale has reported this species (Smithsonian Contr. Bot. 38: 54. 1978 as Leptotrema) but this was not picked up for the checklist.

A LIST OF HEPATICAE FROM YOHO NATIONAL PARK, BRITISH COLUMBIA, CANADA

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Yoho National Park is located in southeastern British Columbia, along the western slope of the Canadian Rockies. Banff National Park occurs to the east, Kootenay National Park to the southeast, and Glacier National Park to the west. Yoho National Park extends from 50°10'-51°40'N to 116°15'-116°45'W.

The park was established in 1886, a year after Banff National Park, and includes 1313 km^2. The park includes Yoho Valley, Kicking Horse River, that flows south into the Columbia River, Daly Glacier, Takakkaw Falls at about 400 m and the highest waterfall in Canada, Emerald Lake, Wapta Falls and Lake O'Hara. There are many high peaks, including Cathedral, Mount Gordon, Stephen and Vaut; the highest peak is Mount Goodsir at 3581 m. Climatically the moist western air flow from the Pacific Ocean predominates in the park, and the north-south orientation of the mountains influences the amount of precipitation.

The flora of the park is diverse due to differences in soil, climate and altitude. Ecologically, three of the twelve biological zones of British Columbia (Krajina, 1959) occur in the park: Interior Douglas fir zone (modified dry forest zone), Subalpine Engelmann spruce-subalpine fir zone, and Alpine zone (alpine tundra vegetation zone). The Interior Douglas fir zone occurs in the Yoho Valley, and the dominant trees are Douglas fir (Pseudotsuga menziesii), paper birch (Betula occidentalis), poplar (Populus tremuloides), western larch (Larix occidentalis) and mountain maple (Acer glabrum). The Subalpine Engelmann spruce-subalpine fir zone occurs near the timberline area, and the dominant trees are alpine fir (Abies lasiocarpa), Engelmann spruce (Picea engelmannii) and white spruce (Picea glauca). The Alpine zone includes the areas above the timberline (2000-2200 m) and red mountain heath (Phyllodoce empetriformis) and white mountain heath (Cassiope mertensiana) occur as climatic climax plants.

Although many collections of vascular plants have been made in the park, there has never been any collections or publications regarding the Hepaticae. The present paper is prepared exclusively on the basis of our own collections that were made during the summer months of 1978, 1980, 1983, 1984 and 1985 (over 1000 numbers) by the senior author, and by the second author while working as a naturalist for the park during 1973 and 1974 (over 200 numbers); specimens borrowed from TENN and YU also have been incorporated. In general, the nomenclature follows Grolle (1983) or Stotler and Crandall-Stotler (1977). Collection numbers without a collector's name are the senior author's. Only one representative specimen of each taxon from each collecting area is cited in the text. Figure 1 gives the location of collecting sites. Voucher specimens are deposited at the College of Great Falls (GFC) and in the herbarium of the University of Alberta (ALTA).

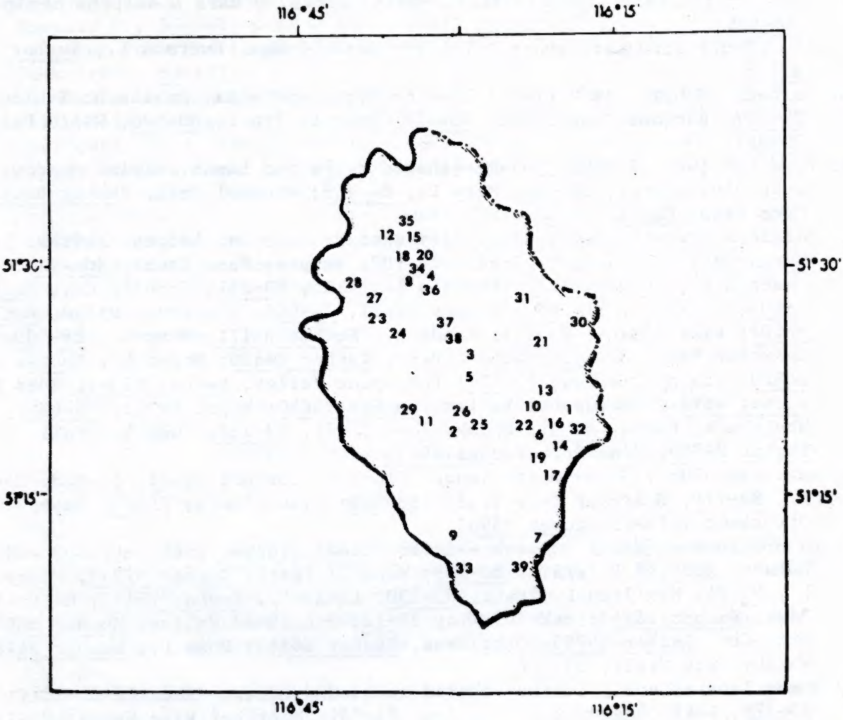

Figure 1. Yoho National Park, British Columbia, Canada; 39 collecting localities. 1. Amiskwi Pass. 2. Avalanche Trail. 3. Burgess Pass. 4. Emerald Lake. 5. Field. 6. Glory Lake. 7. Goodsir Creek. 8. Hamilton Lake. 9. Hoodoos Trail. 10. Ice River Fire Road. 11. Kicking Horse Fire Road. 12. Kiwetinok Ridge. 13. Lake O'Hara. 14. Linda Lake. 15. Little Yoho Valley. 16. Mary Lake. 17. McArthur Pass. 18. Michael Peak. 19. Morning Glory Lake. 20. Mount Pollinger. 21. Narao Lake. 22. Odaray Plateau. 23. Otterhead Trail. 24. Otterhead Valley. 25. Ottertail Creek. 26. Ottertail Flat. 27. Otto Creek. 28. Otto Pass. 29. Porcupine Valley. 30. Ross Lake. 31. Sherbrooke Valley. 32. Snowdrift Creek. 33. Wapta Falls. 34. Wapta Lake. 35. Whaleback. 36. Whisky Jack Trail. 37. Yoho Lake. 38. Yoho River Road. 39. Zinc Creek.

Species List

Athalamia hyalina (Sommert.) Hatt.--moist soil. Yoho R., Kuchar B7242.

Anastrophyllum hellerianum(Nees) Schust.--shaded, decayed wood. Emerald L., Kuchar B5615; Emerald L. Trail, 80-537; Hamilton L. Trail, 83-252; Hoodoos Trail, 79-902; Wapta Falls Trail, 80-549.

A. minutum (Schreb.) Schust.--moist soil. Alpine meadow, Lake O'Hara area, 84-736.

Aneura pinguis (L.) Dum.--moist stream bank. Avalanche Trail, 79-914; Hamilton L. Trail, 83-254; Mary L.-O'Hara L., 84-813.

Anthelia juratzkana (Limpr.) Trev.--moist rocks. O'Hara L.-alpine meadow, 84-705.

Barbilophozia attenuata (Mart.) Loeske--moist ledge. Emerald L., Kuchar B7178.

B. barbata (Schmid. ex Schreb.) Loeske--rocks and soil. Avalanche Trail, 79-907; Burgess Pass Trail, 80-492; Yoho L. Trail, 80-508; Wapta Falls, 79-882.

B. floerkei (Web. & Mohr) Loeske--shaded rocks and humus. Alpine meadow, Lake O'Hara area, 84-664; Mary L., 84-799; Michael Peak, Kuchar B6442; Otto Pass, Kuchar B6664.

B. hatcheri (Evans) Loeske--partially shaded rocks and ledges. Amiskwi Pass, Kuchar B6724; Avalanche Trail, 79-907; Burgess Pass Trail, 80-494; Emerald L., Kuchar B7177; Emerald L. Trail, 83-261; Goodsir Cr., Kuchar B6605; Glory L., 85-100; Hoodoos Trail, 79-902; Kiwetinok Ridge, Kuchar B6102; Lake O'Hara, 84-711; Linda L., Kuchar B6171; Mary L., 84-780; McArthur Pass, 85-133; Michael Peak, Kuchar B6439; Narao L., Kuchar B6820; Odaray Plateau, 85-121; Porcupine Valley, Kuchar B7341; Ross L., Kuchar B6788; Sherbrooke Valley, Kuchar B5990; Wapta Falls, 79-888; Whaleback, Kuchar B6111; Whisky Jack Trail, 83-165; Yoho L. Trail, Kuchar B7523; Zinc Cr., Kuchar B6245.

B. kunzeana (Hüb.) Gams--moist ledge. Glory L. Circuit Trail, 85-108; Mary L., 84-778; McArthur Pass Trail, 85-146; Lake O'Hara, 85-29; Upper Otterhead Valley, Kuchar B5907.

B. lycopodioides (Wallr.) Loeske--moist shaded ledges, rock outcrops and humus. Emerald L. Trail, 80-529; Yoho L. Trail, Kuchar B7277; Glory L., 85-94; Hamilton L. Trail, 83-230; Linda L., Kuchar B6170; Michael Peak, Kuchar B6443; Lake O'Hara, 85-12; Otterhead Valley, Kuchar B6999; Otto Cr., Kuchar B6753; Otto Pass, Kuchar B6663; Ross L., Kuchar B6787; Whisky Jack Trail, 83-170.

B. quadriloba (Lindb.) Loeske--shaded rocks and humus. Emerald L. Trail, 83-278; Lake O'Hara-alpine meadow, 84-701; McArthur Pass Trail, 85-167.

Blepharostoma trichophyllum subsp. *brevirete* (Bryhn & Kral) Schust.--shaded moist soil. Lake O'Hara-alpine meadow, 85-77; Lake O'Hara Trail, 83-221; McArthur Pass Trail, 85-164.

B. trichophyllum (L.) Dum. subsp. *trichophyllum*--shaded, moist soil, rocks and decayed wood. Avalanche Trail, 79-916; Burgess Pass Trail, 80-492; Emerald L. Trail, 83-257; Hamilton L. Trail, 83-234; Lake O'Hara, 84-763; Little Yoho Valley, Kuchar B6414; McArthur Pass Trail, 85-128; Otterhead Valley, Kuchar B7001; Ottertail Cr., Kuchar B6512; Wapta Falls Trail, 80-551; Yoho L. Trail, 80-507; Yoho Valley, Kuchar B7157; Zinc Cr., Kuchar B6282.

Calypogeia integristipula Steph.--shaded decayed wood and moist loam--Emerald L., Kuchar B7177; Emerald L. Trail, 83-258.

C. suecica (H. Arnell & J. Perss.) K. Müll.--shaded decayed wood. Emerald L. Trail, 80-541; Lake O'Hara Trail, 85-4.

C. trichomanis (L.) Corda--moist soil. Hamilton L. Trail, 83-233.

Cephalozia ambigua Mass.--moist soil near stream. Glory L., 85-96; Lake O'Hara, 84-705.

C. bicuspidata (L.) Dum.--shaded, decayed wood. Alpine meadow, Lake O'Hara area, 84-745.

C. lunulifolia (Dum.) Dum.--shaded, decayed wood, wet rocks and streambanks. Burgess Pass Trail, 80-497; Emerald L. Trail, 80-532; Hamilton L. Trail, 83-233; Lake O'Hara Trail, 83-204; Mary L., 84-777; McArthur Pass Trail, 85-128; Ottertail Cr., Kuchar B6512; Snowdrift Cr., Kuchar B7287; Wapta Falls Trail, 80-549; Whisky Jack Trail, 83-168; Yoho L. Trail, 80-507.

C. macounii (Aust.) Aust.--decayed wood. Zinc Cr., Kuchar B6244.

C. pleniceps (Aust.) Lindb.--shaded decayed wood and wet streambanks. Emerald L., 80-546; Lake O'Hara Trail, 83-224; Mary L., 84-791; McArthur Pass Trail, 85-133; Snowdrift Cr., Kuchar B7288; Whisky Jack Trail, 83-172; Yoho Valley, Kuchar B7157.

Cephaloziella brinkmanii Douin--moist rock. Lake O'Hara, Brinkman 704 (YU). This species is known only from the type locality at Lake O'Hara.

C. divaricata (Sm.) Schiffn.--moist ledge and wet rock outcrop. Glory L., 85-96; Hoodoos Trail, 79-897; Lake O'Hara, 84-767; Mary L., 84-780; Wapta Falls, 79-895.

C. hampeana (Nees) Schiffn.--moist humus. Lake O'Hara, MacFadden 6508 (TENN). This species occurs on burnt stumps with *Dicranum* as a pioneer species in secondary succession.

C. rubella (Nees) Warnst.--shaded soil. Burgess Pass Trail, 80-495; Whisky Jack Trail, 83-137.

Conocephalum conicum (L.) Lindb.--moist soil. Mary L.-Lake O'Hara, 84-802.

Diplophyllum taxifolium (Wahlenb.) Dum.--shaded ledge. Snowdrift Cr., Kuchar B7287.

Geocalyx graveolens (Schrad.) Nees--shaded decayed wood. Wapta Falls Trail, 80-551.

Gymnomitrion obtusum (Lindb.) Pears.--thin soil on rocks. Upper Otterhead Valley, Kuchar B5906.

Jamesoniella autumnalis (DC.) Steph.--moist soil. Ice R. Fire Road, Kuchar B6883.

Jungermannia leiantha Grolle--wet soil near stream. Burgess Pass Trail, 80-504; Hoodoos Trail, 79-902; McArthur Pass Trail, 85-134. The edges of the leaves are distinctly a pink-reddish color.

J. exsertifolia Steph. subsp. *cordifolia* (Dum.) Váňa--aquatic, wet rocks near stream. Alpine meadow, Lake O'Hara, 84-735; McArthur Pass Trail, 85-138.

J. sphaerocarpa Hook.--wet rocks near stream. Emerald L. Trail, 80-535; Hamilton L. Trail, 83-239; Alpine meadow, Lake O'Hara, 85-7; Mary L., 84-788; Whisky Jack Trail, 83-163.

Lepidozia reptans (L.) Dum.--shaded decayed wood. Avalanche Trail, 79-912; Burgess Pass Trail, 80-500; Emerald L. Trail, 80-534; Wapta Falls, 79-883; Yoho L. Trail, 80-507.

Lophocolea minor Nees--decayed wood and sandy streambank. Avalanche Trail, 79-909; Burgess Pass Trail, 80-493; Emerald L. Trail, 83-270; Hoodoos Trail, 79-905; Yoho L. Trail, 80-521.

Lophozia ascendens (Warnst.) Schust.--moist, shaded, decayed wood. Glory L., 85-114; Ice R. Fire Road, Kuchar B6898; Odaray Plateau, 85-122; Wapta Falls, 79-884; Wapta Falls Trail, 80-549; Zinc Cr., Kuchar B6239. This species was found in many areas of British Columbia, Alberta and Montana.

L. badensis (Gott. ex Rabenh.) Schiffn.--moist soil. Lake O'Hara, 84-816; Wapta Falls Trail, 80-550.

L. bantriensis (Hook.) Steph.--moist, sandy soil near stream. Emerald L. Trail, 83-259; Hamilton L. Trail, 83-223; Whisky Jack Trail, 83-167.

L. collaris (Nees) Dum.--wet soil near stream. Avalanche Trail, 79-913; Burgess Pass Trail, 80-502; Emerald L. Trail, 83-266; Hamilton L. Trail, 83-242; Lake O'Hara, 83-199; McArthur Pass Trail, 85-128; Otto Cr., Kuchar B6676; Zinc Cr., Kuchar B6283.

L. excisa (Dicks.) Dum.--moist soil. Burgess Pass Trail, 80-495; Yoho L. Trail, 80-526. The species is characterized by its abundant brownish angular 2-celled gemmae in the upper part of the plant.

L. gillmanii (Aust.) Schust.--shaded, moist soil. Upper Ice R., Kuchar B6288; Yoho L. Trail, 80-510. The species is similar to *L. bantriensis*, but is distinguished by its more distinctly elongated beaked perianth, in contrast to the shortly beaked perianth in *L. bantriensis*.

L. groenlandica (Nees) Macoun--shaded moist soil. Emerald L. Trail, 80-538. Compared with *L. wenzelii*, oil bodies of this species are similar to those of *L. ventricosa* var. *silvicola*.

L. guttulata (Lindb. & H. Arnell) Evans--decayed wood and soil. Emerald L., Kuchar B5615; Emerald L. Trail, 80-532; Glory L., 85-99; Hamilton L. Trail, 83-241; Alpine meadow, Lake O'Hara, 84-711; Lake O'Hara Trail, 83-212; Mary L., 84-795; McArthur Pass Trail, 85-154; Michael Peak, Kuchar B6439; Ottertail Cr., Kuchar B6546; Wapta Falls Trail, 80-552.

L. heterocolpos (Thed.) M. A. Howe--wet shaded, decayed wood and moist soil near streams. Burgess Pass Trail, 80-492; Emerald L. Trail, 83-257; Hamilton L. Trail, 83-239; Alpine meadow, Lake O'Hara, 84-717; Mary L., 84-791; McArthur Pass Trail, 85-130; Wapta Falls Trail, 80-554; Whisky Jack Trail, 83-163; Yoho L. Trail, 80-522.

L. incisa (Schrad.) Dum.--shaded moist decayed wood. Burgess Pass Trail, 80-495; Emerald L., Kuchar B5615; Glory L., 85-112; Hamilton L. Trail, 83-231; Alpine meadow, Lake O'Hara, 84-775; Lake O'Hara Trail, 83-203; Michael Peak, Kuchar B6439; Whisky Jack Trail, 83-168; Yoho L. Trail, 80-512.

L. longidens (Lindb.) Macoun--shaded, most, decayed wood. Avalanche Trail, 79-915; Emerald L. Trail, 80-537; Glory L., 85-101; Hoodoos Trail, 79-897; Alpine meadow, Lake O'Hara, 84-660; Ross L., Kuchar B6790; Wapta Falls, 79-891; Whisky Jack Trail, 83-188.

L. opacifolia Culm.--moist soil. Emerald L. Trail, 83-263; Glory L., 85-99; Alpine meadow, Lake O'Hara, 84-718; Lake O'Hara Trail, 83-211; McArthur Pass Trail, 85-149; Ottertail Flats, Kuchar B7034.

L. rutheana (Limpr.) M. A. Howe--moist sand soil near stream. McArthur Pass Trail, 85-148; Whisky Jack Trail, 83-175.

L. sudetica (Hüb.) Grolle--moist soil. Emerald L., Kuchar B5889; Glory L., 85-96; Little Yoho Valley, Kuchar B6413; Alpine meadow, Lake O'Hara, 84-703; Mary L., 84-780; Odaray Plateau, 85-126.

L. ventricosa var. *silvicola* (Buch) Jones--shaded -ecayed wood. Emerald L. Trail, 80-537; Alpine meadow, Lake O'Hara area, 84-702. This variety has also been reported in southwestern British Columbia (Godfrey, 1977) and in northeastern Washington (Hong, 1978).

L. ventricosa (Dicks.) Dum. var. *ventricosa*--shaded, decayed wood and ledges. Avalanche Trail, 79-916; Burgess Pass Trail, 80-497; Emerald L., Kuchar B5648; Emerald L. Trail, 80-534; Glory L., 85-91; Hamilton L. Trail, 83-231; Hoodoos Trail, 79-905; Alpine meadow, Lake O'Hara area, 84-761; Little Yoho Valley, Kuchar B6365; Mary L., 84-777; McArthur Pass, Kuchar B5577; Michael Peak, Kuchar B6439; Odaray Plateau, 85-121; Otterhead Valley, Kuchar B7000; Ottertail Cr., Kuchar B6547; Sherbrooke Valley, Kuchar B6021; Wapta Falls Trail, 80-552; Whisky Jack Trail, 83-161; Yoho L. Trail, 80-511.

L. wenzelii (Nees) Steph.--moist soil. Alpine meadow, Lake O'Hara area, 84-664; Sherbrooke Valley, Kuchar B6014; Snowdrift Cr., Kuchar B7287.

Marchantia alpestris (Nees) Burgeff--moist soil near stream. Hamilton L. Trail, 83-239; Alpine meadow, Lake O'Hara area, 84-814; Whisky Jack Trail, 83-169. The species occurs exclusively in undisturbed habitats, in contrast to *M. polymorpha*, which occurs in man-disturbed habitats, as described by Schofield (1968) for British Columbia.

M. polymorpha L.--wet rocks and soil near stream. Emerald L. Trail, 80-536; Goodsir Cr., Kuchar B6573; Mary L.-Lake O'Hara, 84-802; Otto Cr., Kuchar B6760; Wapta L., Kuchar B5858; Yoho L. Trail, 80-513; Yoho R. Road,

Kuchar B5513. The thallus of many collections, especially those collected in the subalpine zones, are leathery and thicker than the typical lowland form. However, there are dark lines recognizable along the midrib of the thallus.

Mylia anomala (Hook.) S. Gray--on *Sphagnum*. Mount Pollinger, Kuchar B6735.

M. taylorii (Hook.) S. Gray--wet rocks near stream. Alpine meadow, Lake O'Hara, 85-57.

Pellia endiviifolia (Dicks.) Dum.--wet rocks and soil near stream. Emerald L. Trail, 83-268; Alpine meadow, Lake O'Hara area, 84-726; Mary L., 84-803; Yoho L. Trail, 80-506.

Plagiochila porelloides (Torrey ex Nees) Lindenb.--wet rocks and soil near stream. Burgess Pass Trail, 80-502; Emerald L. Trail, 83-279; Hoodoos Trail, 79-906; Ice R. Road, Kuchar B7217; Alpine meadow, Lake O'Hara area, 85-75; Yoho L. Trail, 80-517. The leaf margins of many collections are entire as are many other collections made from other areas of British Columbia (Hong, 1979, 1981). In contrast, the marginal teeth of some collections are 4-celled in length and 1-2 cells in width, but never reach 3 cells wide at the base.

Pleuroclada albescens (Hook.) Spruce--moist thin soil on rock. Snowdrift Cr., Kuchar B7288.

Preissia quadrata (Scop.) Nees--moist soil. Wapta Falls Trail, 80-550; Yoho R. Road, Kuchar B5516.

Ptilidium pulcherrimum (G. Web.) Hampe--shaded, decayed wood. Avalanche Trail, 79-910; Emerald L., Kuchar B5647; Emerald L. Trail, 80-530; Hamilton L. Trail, 83-241; Hoodoos Trail, 79-903; Kicking Horse Road, Kuchar B7544; Alpine meadow, Lake O'Hara area, 84-660; Lower Porcupine Valley, Kuchar B7351; Mary L., 84-794; McArthur Pass, Kuchar B5576; Ross L., Kuchar B6790; Wapta Falls, 79-885; Yoho L. Trail, 80-519. This species occurs on burned stumps as a pioneer species in Montana, Wyoming, Idaho and Colorado.

Radula complanata (L.) Dum.--bark. McArthur Pass, Kuchar B7403; Yoho R. Road, Kuchar B5364.

Riccardia latifrons Lindb.--decayed wood. Avalanche Trail, 79-912; Emerald L. Trail, 80-533.

Scapania curta (Mart.) Dum.--wet soil near stream. Emerald L. Trail, 80-533; Lake O'Hara, 84-769; Mary L., 84-800; Whisky Jack Trail, 83-172.

S. cuspiduligera (Nees) K. Müll.--moist shaded soil near stream. Lake O'Hara, 84-820.

S. irrigua (Nees) Gott. et al.--moist soil near stream. Alpine meadow, Lake O'Hara area, 85-39.

S. mucronata Buch--shaded moist soil. Alpine meadow, Lake O'Hara area, 85-77.

S. paludosa (K. Müll.) K. Müll.--moist, shaded soil near stream. Alpine meadow, Lake O'Hara area, 84-721.

S. subalpina (Nees) Dum.--wet rocks of streambank. Alpine meadow, Lake O'Hara area, 84-753.

S. umbrosa (Schrad.) Dum.--shaded, decayed wood. Lake O'Hara, 85-18.

S. undulata (L.) Dum.--shaded, decayed wood and wet soil near stream and waterfall. Amiskwi Pass, Kuchar B6998; McArthur Pass Trail, 85-167; Whaleback, Kuchar B6109.

Tritomaria exsectiformis (Breidl.) Loeske--shaded, decayed wood. Avalanche Trail, 79-908; Burgess Pass Trail, 80-498; Field, Kuchar B5447; Hoodoos Trail, 79-900; Mary L., 84-797; Ottertail Cr., Kuchar B6512; Wapta Falls, 79-884; Yoho L. Trail, 80-512.

T. polita (Nees) Joerg.--wet rocks near stream. Emerald L. Trail, 83-257; Alpine meadow, Lake O'Hara area, 84-721; McArthur Pass Trail, 85-136;

Ottertail Flats, Kuchar B7198; Porcupine Valley, Kuchar B7321; Sherbrooke Valley, Kuchar B5997. This species is distinguished by its distinctly elongated cortical stem cells and strongly elongated basal leaf cells.

T. quinquedentata (Huds.) Buch--shaded rocks. Glory L., 85-83; Little Yoho Valley, Kuchar B6368; Alpine meadow, Lake O'Hara area, 84-765; McArthur Pass Trail, 85-160; Snodrift Cr., Kuchar B7287; Whisky Jack Trail, 83-16.

T. scitula (Tayl.) Joerg.--shaded soil. Emerald L. Trail, 83-267; Hamilton L. Trail, 83-245; Alpine meadow, Lake O'Hara area, 84-723; Mary L., 84-813; McArthur Pass, Kuchar B7367; Ottertail Flats, Kuchar B7199; Yoho R. Road, Kuchar B5488; Whisky Jack Trail, 83-164.

Geographical Relationships

The hepatic flora of Yoho National Park comprises 19 families, 29 genera, 72 species, 3 subspecies and one variety. These taxa belong to seven different distributional elements.

1. Circumpolar-arctic-boreal alpine-montane--Thirty five taxa (46.1% of the total) belong to this group. The species that show this distribution pattern inhabit arctic, boreal, alpine and mountain forest regions. The species considered to belong here are: *Anastrophyllum minutum*, *Athalamia hyalina*, *Barbilophozia barbata*, *B. hatcheri*, *B. kunzeana*, *B. lycopodioides*, *B. quadriloba*, *Blepharostoma trichophyllum* subsp. *trichophyllum*, *B. t.* subsp. *brevirete*, *Cephalozia ambigua*, *Diplophyllum taxifolium*, *Gymnomitrion obtusum*, *Jungermannia exsertifolia* subsp. *cordifolia*, *J. sphaerocarpa*, *Lophozia bantriensis*, *L. collaris*, *L. excisa*, *L. opacifolia*, *L. rutheana*, *L. sudetica*, *L. ventricosa* var. *silvicola*, *L. wenzelii*, *Scapania curta*, *S. cuspiduligera*, *S. irrigua*, *S. paludosa*, *S. subalpina*, *Tritomaria polita*, *T. quinquedentata* and *T. scitula*.

2. Circumpolar, boreal montane--The following fifteen taxa (19.7% of the total) are mainly restricted to boreal forests and mountain forest zones: *Anastrophyllum hellerianum*, *Barbilophozia attenuata*, *Calypogeia suecica*, *C. trichomanis*, *Cephalozia macounii*, *C. pleniceps*, *Jungermannia leiantha*, *Lophozia badensis*, *L. guttulata*, *L. longidens*, *Mylia anomala*, *M. taylorii*, *Pellia endiviifolia*, *Scapania mucronata* and *Tritomaria exsectiformis*.

3. Circumpolar, arctic-temperate alpine-montane--Twelve taxa (15.8 % of the total) are found in arctic, boreal and temperate latitudinal zones and in alpine and mountain forest regions. The following taxa are included: *Aneura pinguis*, *Cephalozia bicuspidata*, *C. lunulifolia*, *Cephaloziella divaricata*, *Jamesoniella autumnalis*, *Lophozia ventricosa*, *Marchantia alpestris*, *M. polymorpha*, *Plagiochila porelloides*, *Preissia quadrata*, *Scapania umbrosa* and *S. undulata*.

4. Circumpolar, boreal-temperate montain--Ten species (13.2% of total) inhabit boreal, temperate and mountain forest zones. The species considered to belong here are: *Calypogeia integristipula*, *Cephaloziella hampeana*, *C. rubella*, *Conocephalum conicum*, *Geocalyx graveolens*, *Lepidozia reptans*, *Lophocolea minor*, *Ptilidium pulcherrimum*, *Radula complanta* and *Riccardia latifrons*.

5. Circumpolar, arctic alpine--Two species, *Anthelia juratzkana* and *Pleuroclada albescens* (2.6% of the total) are found only in arctic and alpine areas.

6. Circumpolar, eastern boreal montane--One species, *Lophozia ascendens*, (1.3%) is found mainly in the boreal zone, east of the Rocky Mountains.

7. Endemic Canadian Rocky Mountain species--One species, *Cephaloziella*

brinkmanii (1.3%) has been collected at only one locality--on the bank of Lake O'Hara (ca. 2000 m) by Brinkman.

Acknowledgments

The senior author thanks President W. Shields, Dean T. O'Hare, Chairman E. Peressini and Sister M. Benoit for their assistance. We are also grateful to Dr. P. Benson, Western Region Parks Canada, Calgary, Alberta, and chief warden of Yoho National Park, Field, British Columbia, for the permission to collect; and to the curators at TENN and YU for the loan of specimens for this study.

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1988 BLOMQUIST FORAY

The fourth annual Blomquist Bryological Foray is scheduled for 30 September-2 October, 1988. The foray this year will be held in the northwestern corner of Georgia. This part of the state lies in the Valley and Ridge Province of the Appalachian Highlands and is characterized by sheer-sided sandstone mountains and rolling valleys with limestone floors. There have been few studies of the vascular flora of this region and even fewer attempts to collect and determine species of bryophytes. We will be based at Cloudland Canyon State Park (elev. 1890') on the western face of Lookout Mountain. Day trips are also planned to limestone formations, including The Pocket of nearby Pigeon Mountain and the cedar glades of Catoosa Co. Northwestern Georgia is easily reached by a number of interstate highways that pass near or through Chattanooga, Tennessee, including I 75, 81, 24 and 59. Amateurs, professionals, students, and their families are all welcome. For further information and registration forms please contact the organizers: Ann Stoneburner/Robert Wyatt, Department of Botany, University of Georgia, Athens, GA 30602.

BARBULA EHRENBERGII NEW TO THE MOSS FLORA OF NEW MEXICO WITH ADDITIONAL EDDY COUNTY RECORDS

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Eddy County, New Mexico, is located in the northern margin of the Chihuahuan Desert region. No reports have hitherto been published with respect to its moss flora.

All specimens are deposited at BUF.

Barbula ehrenbergii (Lor.) Fleisch.--U.S.A., New Mexico: Eddy County, Sitting Bull Falls, Lincoln National Forest; region of desertification, open gravel pavements with cholla cactus, opuntias, pedestalled yuccas, *Ocotilla*, *Forquieria*, *Dasylirion*; rather scarce, along one horizontal stratum in water, 2 Sep 1986, *Eckel & Zander 86129*.

Although a feature no specifically illustrated in floras I have seen, the occurrence of two teeth at the apex of at least some of the rather rigid leaves provides a good lead to identifying this species. It grows in association with running water in limestone regions. It is tufa forming, as are the taxa with which it is associated at this station. This species reaches the northern part of its range in the American Southwest: published reports note stations in Oklahoma, Texas and Missouri (Steere, 1938) and Utah (Flowers, 1973). An Arizona citation occurs in Johnsen (1978); Mahler (1980) gives reports from the limestone areas of western Texas contiguous with the present station, and Crum and Anderson (1981) report additonal localities. Zander (in press) cites New World stations throughout Mexico (Chiapas, Coahuila, Nuevo León, Querétaro, San Luis Potosí, Tamaulipas) to British Honduras. There is one report from the state of Guerrero, Mexico (Eckel, in prep.).

Associated taxa:

Conardia compacta (C. Müll.) Robins.--*Eckel & Zander 86128*. This is the second report fro the state after Grout (1931, p. 71).

Didymodon tophaceus (Brid.) Lisa--*Eckel & Zander 870216*.

Eucladium verticillatum (Brid.) B.S.G.--*Eckel & Zander 8706231*; *86117*: an unusual ditrichoid form with upper laminae only one or two rows of cells in width occurs with typical material.

Hymenostylium recurvirostrum (Hedw.) Dixon--*Eckel & Zander 870215*. This is the most abundant moss covering wet rocks.

Other mosses collected along roadsides in the county include:

Aloina rigida (Hedw.) Limpr. var. *rigida*--*Zander & Eckel 870212*.

Bryum argenteum Hedw.--*Eckel & Zander 86131*.

Crossidium aberrans Holz. & Bartr.--*Eckel & Zander 870214*.

C. crassinerve (De Not.) Jur.--*Eckel & Zander 86116*, *870214*. This is the second report for the state after Stark and Castetter (1986).

Desmatodon convolutus (Brid.) Grout--*Zander & Eckel 870216*; *Eckel & Zander 870207*, *86116*.

Didymodon australasiae var. *umbrosus* (C. Müll.) Zand.--*Eckel & Zander 231685*.

D. revolutus (Card.) Williams--*Eckel & Zander 332685*.

D. rigidulus var. *rigidulus* Hedw.--*Eckel & Zander 86115*, *432685*.

D. rigidulus var. *gracilis* (Schleich. ex Hook. & Grev.) Zand.--*Eckel & Zander 870206*.

Fissidens obtusifolius Wils.--*Eckel & Zander 870212.*

Grimmia rauii Aust.--*Eckel & Zander 86122.*

G. wrightii (Sull.) Aust.--*Eckel & Zander 86130, 86119.* These two species of *Grimmia* are sometimes considered marginally distinct (cf. Lawton, 1971); or as two good species in *Jaffueliobryum* (cf. Churchill, 1987).

Molendoa sendtneriana(B.S.G.) Limpr.--*Eckel & Zander 870209; Zander & Eckel 870214.*

Pleurochaete squarrosa (Brid.) Lindb.--*Eckel & Zander 870210; Zander & Eckel 870217.*

Pseudocrossidium aureum (Bartr.) Zand.--*Eckel & Zander 86133, 132685.*

P. replicatum (Tayl.) Zand.--*Eckel & Zander 86132.*

Sterile bryaceous species and those of the genus Weissia were present in many of these collections and both have a conspicuous presence in the New Mexican bryoflora. Capsules of Weissia species are present in the early months of the year, and are generally gone by the end of June in my experience.

This work was performed during an appointment as Collaborator in the Botany Division, Smithsonian Institution, Washington, D.C. (1986-1988).

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TWO MOSSES NEW TO IDAHO

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Paul J. Johnson recently collected two species of moss in Idaho that were not reported by Lawton (1971) or McCleary and Green (1971).

Aloina brevirostris (Hook. & Grev.) Kindb.--Boundary County: 0.5 mi W of Copeland, at bridge on Kootenai River, T.64N, R.1W, NE¼NE¼ Sec. 13; on sandy clay soil above normal regulated river level, within seasonal inundation zone, with *Dicranella varia* in stand of *Salix* and *Phalaris arundinacea*, *Johnson ID-062* (ID, MIL). Nearest reported populations: British Columbia, Alberta, Montana (Steere, 1950; Lawton, 1971; Delgadillo, 1975; McIntosh, 1986).

Antitrichia curtipendula (Hedw.) Brid.--Clearwater County: Clearwater National Forest, near Aquarius Campground, N Fort Clearwater River, T.40N, R.7E, NW¼NW¼ Sec. 5; with *Homalothecium fulgescens* on rotten conifer log, under dense canopy of *Thuja plicata*, edge of stand of *Alnus rubra*, with *Athyrium filix-femina*, *Oplopanax horridum* and *Asarum caudatum*, *Johnson ID-044* (ID, MIL). Nearest reported populations: British Columbia, Washington, Oregon, Montana (Lawton, 1971).

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GROWTH AND DEVELOPMENT OF SPHAGNUM SUBTILE PROTONEMATA

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Introduction

Reproduction by spores in the field by *Sphagnum* has not been carefully documented. This, in spite of observations that species such as *S. nemoreum* Scop., *S. fimbriatum* Wils., *S. compactum* DC., *S. trinitense* C. Müll., *S. strictum* Sull., *S. fitzgeraldii* Ren. and *S. tenellum* (Brid.) Brid. frequently produce sporophytes, suggesting that spore production for these species is adaptive (Andrus, 1986). I have observed protonemata in natural populations of *S. subtile* (Russow) Warnst. in northern Vermont, but at the time I did not study them closely. I found germinating spores, filamentous and thalloid protonemata, and thalli with attached gametophores (McQueen, 1985). Other reports of *Sphagnum* protonemata in nature are based on a few unconfirmed reports (Anderson & Crosby, 1965).

I undertook this investigation because there is very little known about *Sphagnum* protonemata in natural populations for any species. The purpose of the study was to compare the growth and development of *S. subtile* protonemata in natural populations with those grown in laboratory culture.

Methods

Sporophytes of *S. subtile* were collected from several peatlands in northern Vermont. Single crushed capsules were placed in test tubes containing the standard solution of Boatman and Lark (1971) and on sterile commercial peat saturated with the standard solution in petri dishes. The composition of the standard solution in milligrams per liter of distilled water is as follows: $NaH_2PO_4 \cdot 2H_2O$, 208; $Ca(NO_3) \cdot 4H_2O$, 236; $MgSO_4 \cdot 7H_2O$, 225; KNO_3, 202; NaCl, 5.6; $MnSO_4H_2O$, 2.2; $CuSO_4 \cdot 5H_2O$, 0.24; $ZnSO_4 \cdot 7H_2O$, 0.29; H_3BO_4, 1.86; $(NH_4)_6Mo_7O_{24} \cdot 4H_2O$, 0.035. One milliliter of a suspension containing 2.8 mg of Fe-EDTA was added to one liter of the standard solution. Both types of cultures were subjected to a day length of 16 hours, a temperature of 25°C, and a light intensity of 142 $\mu E/m^2/sec$ frin cool white fluorescent lights.

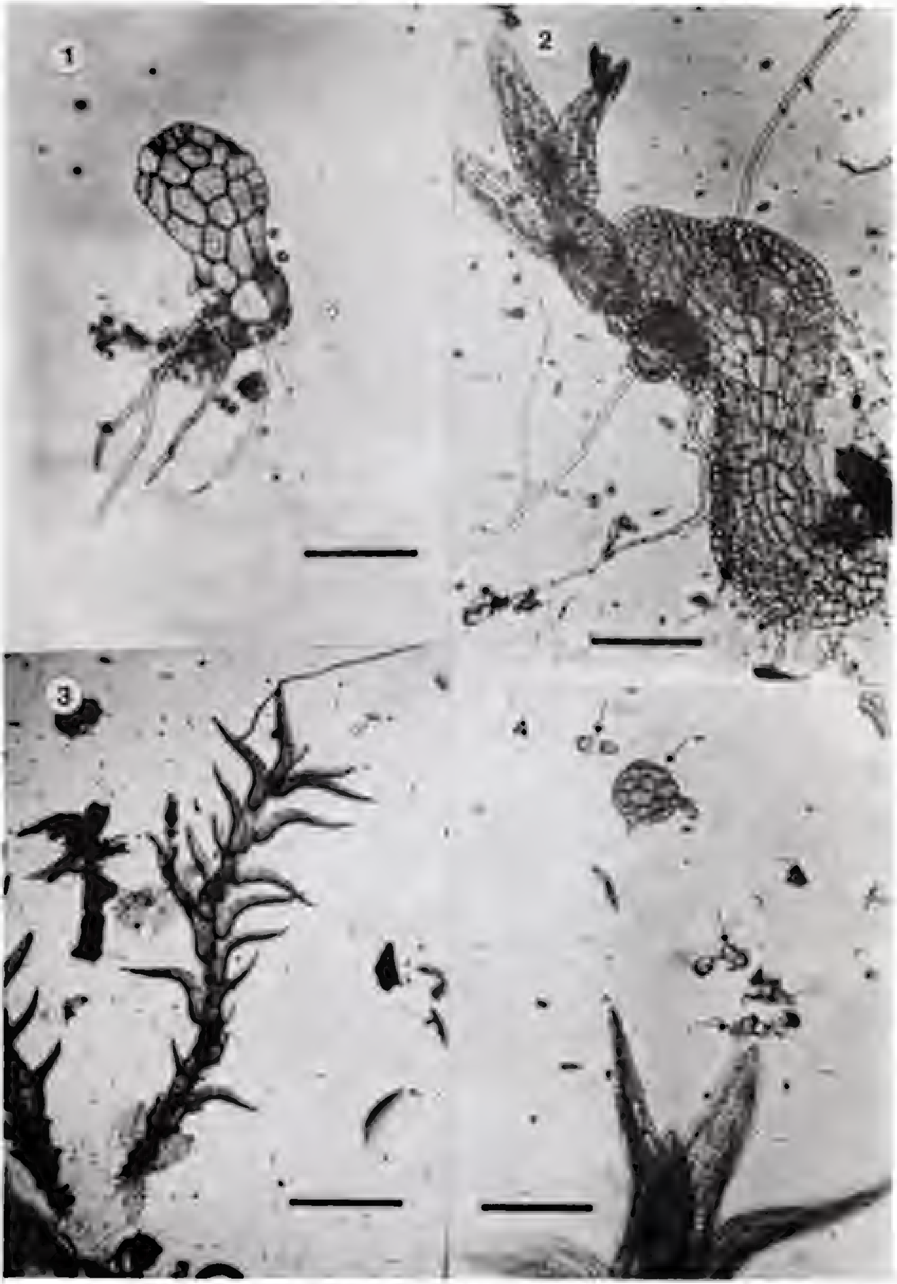
Leafy gametophytes were observed on the commercial peat cultures after approximately 40 days. Intact portions of *S. subtile* colonies and samples of the surrounding humus were collected at this time from the original collection sites and examined for protonemata.

Results

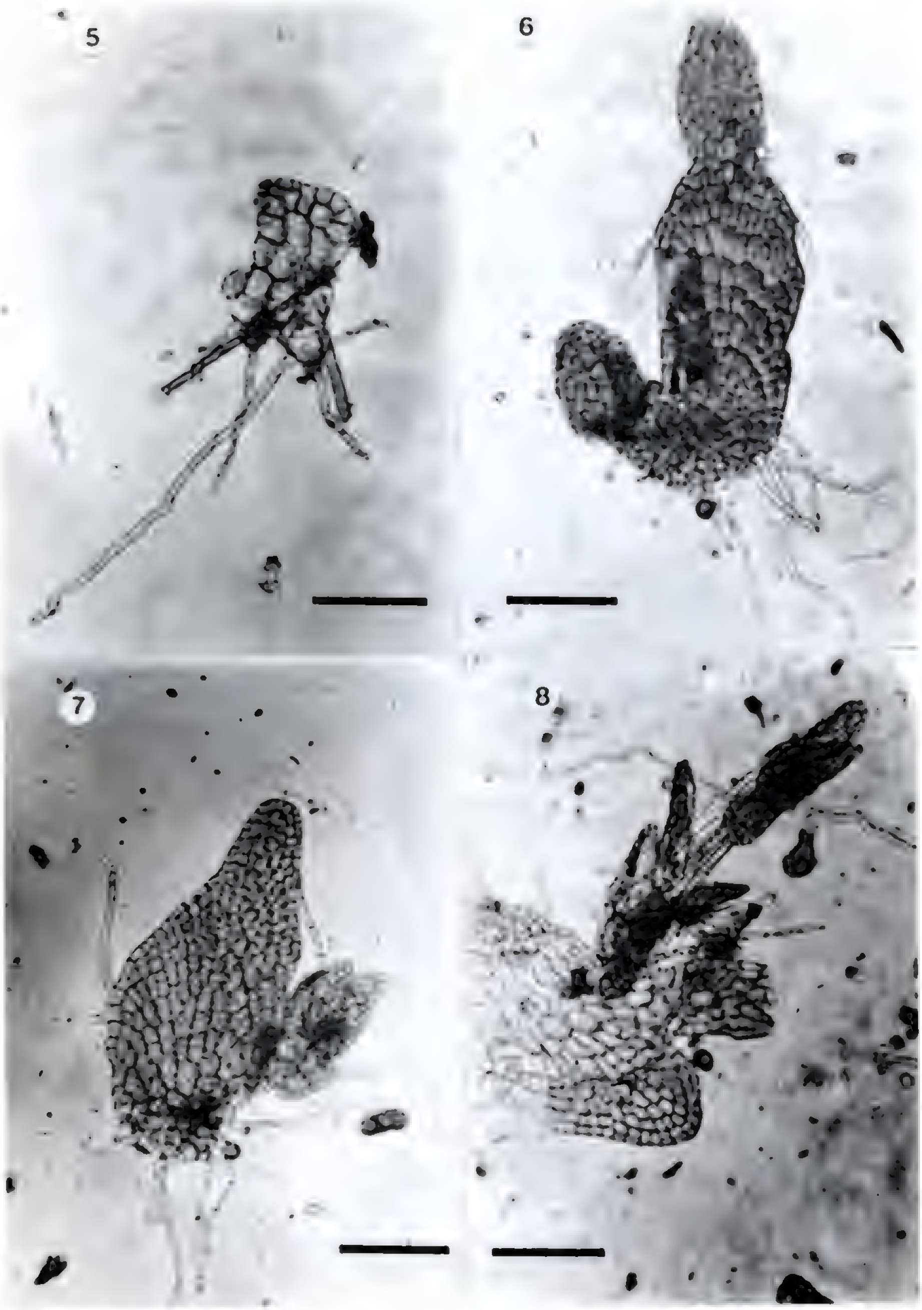
The protonemata of *S. subtile* in the field were predominantly thalloid with a few unbranched rhizoids at the base (Figs. 1-3). Germinating spores and small thalloid protonemata were found in the branches of mature plants (Fig. 4). Young leafy gametophytes all had squarrose leaves although this is not characteristic for mature plants of this species. Many young leafy gametophytes were found, but only a few were attached to a thalloid protonema.

The protonemata that developed on the commercial peat were similar to those found in the field. In general, the protonemata were thalloid with attached rhizoids (Figs. 5-7) although the leafy gametophytes were not as large as those found in the field (Fig. 8). The young gametophytes also had squarrose leaves like those found in the field.

No leafy gametophytes were observed in the aqueous cultures. Thalloid protonema of the aqueous cultures were small and associated with extensively branched filamentous protonemata similar to protonemata of mosses in the Bryales (Figs. 9, 10).



Figs. 1-4. Representative naturally occurring prothalli from Peacham, VT. 1. Prothallus with basal rhizoids. Bar = 100 µm. 2. Prothallus with immature leafy gametophyte. Bar = 130 µm. 3. Prothallus with leafy gametophyte. Bar = 240 µm. 4. Germinating spores and prothalli dissected from axils of leaves from mature gametophytes. Bar = 200 µm.



Figs. 5-8. Representative prothalli grown on commercial peat substrate. 5. Prothallus with basal rhizoids. Bar = 100 µm. 6. Prothallus. Bar = 130 µm. 7, 8. Prothallis with immature leafy gametophytes. Bars = 130 µm.

Discussion

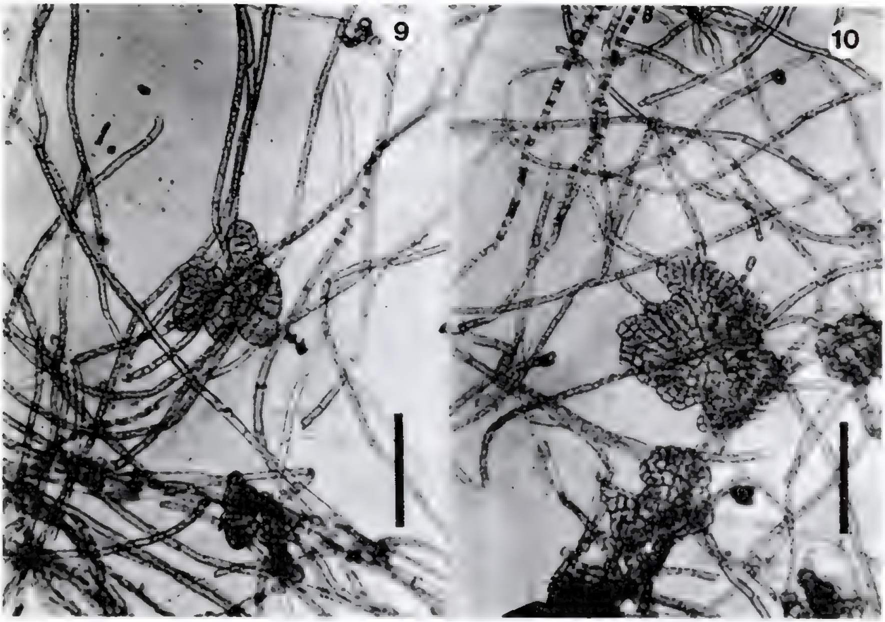
The pattern of development for S. subtile protonemata is similar to that of other species in the genus. A filamentous phase preceeds the development of a thallus that produces buds from which gametophores develop. Schimper (1858) reported that highly branched filamentous protonemata, with small thalli, are the result of growth in an aqueous medium. Boatman and Lark (1971) and McQueen (1987) reported similar growth forms in their aqueous cultures of Sphagnum protonemata. Growth and development of S. subtile protonemata on moist commercial peat and in the field are similar to those of other species grown on solid substrates such as agar (Bold, 1948).

The results of this investigation are significant because there is little or no evidence that the spores of any species of Sphagnum germinate and eventually result in the establishment of leafy gametophores in the field. Boatman and Lark (1971) were not able to germinate spores in water taken from several peatlands. Based on their experimental cultures, they concluded that the low phosphate concentration in the peatland water was a major limiting factor in spore germination and protonematal growth. In addition to phosphate, I have found that low concentrations of calcium and magnesium also limit the growth and development of Sphagnum protonemata (McQueen, 1987). In that study I reported that the protonemata of more ombrotrophic species such as S. nemoreum, S. fuscum (Schimp.) Klinggr. and S. rubellum Wils. are more sensitive to low concentrations of ions, whereas more minerotrophic species, such as S. russowii Warnst., S. girgensohnii Russow and S. centrale C. Jens., are able to tolerate a much broader range of ion concentrations.

The standard solution used in the present study and in those of McQueen (1987) and Boatman and Lark (1971) provides ion concentrations in excess of what is generally found in transitional and rich fens (Moore & Bellamy, 1974). Low ion concentrations in peatlands may account for the apparent absence of protonemata in the field despite the presence of large numbers of sporophytes for some species. It is possible that habitats condusive to protonematal growth are very different from those of mature gametophores for some species.

In the case of S. subtile, which is found in moderately minerotrophic woodland habitata (Andrus, 1980, 1986), it is not surprising to find protonemata in the same habitat as the mature gametophores. Experimental evidence indicates that the protonemata of this species can tolerate low ion concentrations (McQueen, 1987). It is likely that the protonemata of other minerotrophic species are able to grow in or near the same habitat as the mature gametophores. Conversely, the protonemata of more ombrotrophic species are not likely to be found in the same habitats as the mature gametophores. However, further studies are needed in the ecology of Sphagnum protonemata to substantiate these hypotheses.

The apparent lack of protonemata in the field may also be due to their ephemeral nature. I did not find any protonemata or germinating spores in any of the populations I sampled during the following spring after the snow had melted in mid-April. Most species of Sphagnum disperse their spores in the summer. Growth and development of gametophores from protonemata proceeds rapidly, usually within two months of spore dispersal (McQueen, 1985). The results of this investigation indicate that leafy gametophores are easily detached from thalloid protonemata. This may give the impression that small leafy gametophores have originated by fragmentation of larger plants as reported by Lane (1977). Any search for protonemata in the field should be undertaken within two months of spore dispersal, in light of the rapid development of gametophores from protonemata, their ease of detachment from the thallus, and the ephemeral nature of the protonema.



Figs. 9, 10. Representative prothalli with highly branched protonemata. Bar = 130 µm

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GYALIDEOPSIS VAINIOI NEW TO NORTH AMERICA

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Gyalideopsis vainioi Kalb & Vězda (1988) has been only recently separated from Gyalideopsis argentea (Mont.) Kalb & Vězda [Echinoplaca argentea (Mont.) R. Sant.]. It is recognized by its thin, closely adnate, weakly pruinose apothecia, branched and interconnected paraphyses, hymenium and asci I–, single muriform spore per ascus, flabellately divided hyphophores and growing on bark. Within Gyalideopsis it is distinguished by the pruinose disk and growing on bark. The initial collection from Florida was determined as Echinoplaca argentea, a species which is now considered by Kalb and Vězda to belong in Gyalideopsis on the basis of apothecial anatomy and type of hyphophore. With the publication of Kalb and Vězda's treatment of the neotropical Gomphillaceae and the collection of additional material, it seems best referred to their new species, G. vainioi, known from Brazil and Mexico. A total of seven thalli has been collected, all with numerous apothecia but only one has immature hyphophores. Our specimens have a much less well developed apothecial margin than is described and illustrated but seem identical otherwise. Due to the lack of margin confusion is possible with Echinoplaca, however the two species reported from North America both grow on leaves.

Gyalideopsis vainioi has been collected by the second author at two nearby sites in central Florida on 0.5-2.0 cm thick branches of Myrica cerifera (Florida, Polk County: Fedhaven, near abandoned airstrip, 26 Nov 1987, Wheeler, 1 Jun 1988, Wheeler; Nalcrest, opposite water pumping station, 15 Jun 1988, Wheeler, all NY). The Fedhaven area apparently has been disturbed due to the airstrip and its parking area but is now generally low pine woods with seasonally marshy spots and an area dominated by wax myrtle (Myrica cerifera) on which the Gyalideopsis was collected. Also important are gallberry (Ilex glabra), a blackberry (Rubus betulifolia), southern fox grape (Vitis munsoniana) and blueberries (Vaccinium corymbosum and V. darrowii). There are also scattered oaks, slash pine (Pinus elliotii), sumac (Rhus copallina), staggerbush (Lyonia fruticosa), saw palmetto (Serenoa repens), Hypericum brachyphyllum and a fern, Woodwardia virgnica.

Kalb, K. & A. Vězda. 1988. Neue oder bemerkenswerte Arten der Flechtenfamilie Gomphillaceae in der Neotropis. Bibliotheca Lichenologica 29: 1-80, figs. 1-39.

CURATION OF SOIL LICHENS

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Lichens occurring on soil are poorly known, in part because of poor curation and the resulting lack of good specimens for comparison identification. There is not a single correct way to curate soil lichens, but several, depending on the specimen, the soil type, and the materials available. The following methods are suggested in the hope that they will encourage more people to collect soil lichens and that the resulting specimens will be well preserved. This will advance the knowledge of soil lichens.

COLLECTION

Ensuring good results starts in the field at collection time. Moist lichens are more flexible and are less likely to be broken. If the lichen to be collected is very dry, it is helpful to spray it with water. Sprayers which produce a fine mist seem to work best. Those with a coarse spray tend to erode the soil specimens quickly. If a mister is available at collection time, the specimen can be inverted, sprayed, and the bottom trimmed so that it is as flat as possible. Particularly delicate soil crusts should be wrapped in several layers of paper (wax paper, tissue paper, newspaper...no plastic), time and weather permitting, and then placed in folded paper packets, paper bags or in firm containers such as film canisters or cardboard boxes. Taking extra time and patience at this stage reduces the chance of returning to the lab with nothing but bags of loose soil mixed with fragments of indistinguishable lichen.

PREPARATION

Schneider (1898), Savile (1973) and Hale (1979) describe pressing lichens in a plant press after moistening. These methods are suitable for most foliose and fruticose lichens, but those occurring on soil need addition preparation and care. Dust and soil on the surface of lichens can usually be removed just by blowing on them. Excess soil around the edges and on the bottom can be trimmed with a knife. Misting the specimen with water will help prevent crumbling. Be sure to leave enough soil to bind the lichen thallus together. This will vary depending on the soil type, but usually the final specimen will be anywhere from 1-20 mm thick. The undersurface should be flat to facilitate gluing to cards later.

The most durable soil lichens can be immersed briefly in water and placed in a plant press until air dry. If your tap water contains a lot of minerals, use distilled water instead, as minerals may affect chemical identification tests (Thomson, 1967). When using plant dryers, avoid temperatures above 25°C or lichen acids may discolor the specimen. Most soil crusts are fragile and should not be pressed. Instead, go directly to the reinforcing glue process. The lichen thalli may be firmed up with glue for sectioning if so desired (Ryan & McWhorter, 1986), but most herbarium collections are discolored and devalued by the direct application of glue.

REINFORCING GLUE

Now it is beneficial to reinforce the soil supporting the lichen thallus to prevent breakage. When doing so, use a water-based brown (wood) glue, such as LePages, or herbarium glue from a botanical supply company such as Carpenter/Offutt Paper Company. Such glues should be diluted at a 4:1 water to glue ratio. The ratio of water to glue depends on the type of soil the lichens are occurring. Brown glue is more viscous, dilutes more readily and has a lower surface tension than white glue. White glues such as Elmer's are less suitable because the higher surface tension does not allow it to penetrate the soil as rapidly. However, such glue diluted 1:1 with water can be used if the specimens are moist or have been misted. Other suitable glues include library paste or "runny" paste.

The glue can be applied in any of several methods. One method is to apply the diluted glue to the underside of the lichen/soil clump using a sponge applicator. These applicators are tubes with a removable end that contain a small 1x2 cm sponge, and are used by businesses to moisten envelopes and stamps during mass mailings. One brand name is Pres-to-Seal moistener (IDL Corp., 730 Garden St., Carlstadt, NJ 07072). They can be purchased at office supply stores. In a second method, soil clumps are placed in a small pool of glue poured onto a nonabsorbent surface such as waxed paper, acetate, glass, or other similar material. This glue will permeate the soil by capillary action and forces adhesion and cohesion. Allow the soil to absorb a generous amount of glue, but avoid moistening the lichen thallus itself. The third method is to moisten the soil clumps by spraying dilute glue on their bottom surfaces.

In each of the three methods an additional purpose for the thin reinforcing glue is to form a seal to keep the thicker mounting glue (the next procedure) from penetrating the lichen. Glue can also be mixed in one of the ubiquitous film canisters and applied with inexpensive water color brushes (thoroughly rinsed after use). This method is particularly effective with thick specimens as it allows better sealing of the side of the specimen. Diluted Elmer's glue can also be dispensed right from an Elmer's glue bottle.

If the soil is hydrophobic to the dilute glue mixture, pure water should first be applied by a fine mist, followed with the diluted glue. The finer the soil texture the more dilute the glue/water mixture needs to be.

Some lichens occur on small pedestals or mounds of soil. Once these soil mounds are thorougly moistened, apply pressure with your finger(s) to flatten them. Often one will also have to moisten the lichen thallus on the top of the clump with pure water before attempting to flatten the soil mound. This makes it more pliable to work with, hopefully leaving the thallus intact and fracturing only where the soil holds it together. The mound may only partially flatten, but this is usually enough to decrease its thickness sufficiently to accommodate the curating envelope.

Glued specimens should be allowed to air-dry overnight at room temperature on a non-adhesive surface. Both brown and white glues are water-based so can be soaked loose at a later time. The plastic glues used in some herbaria are not as expedient, as they are permanent and produce harmful fumes.

MOUNTING GLUE

Now the lichen is ready to mount on a flat white card. If specimens are glued to cards it is important to use cards without a fluorescent-sensitive surface since their vivid fluorescence will mask the subtler colors found in lichens and will necessitate removing the specimen from the card before examination. Average card size is 9 x 12 cm with a thickness of 0.5-1.0 mm. Thick cards will give more support to a curated solid crust and insure a longer herbarium life. The more fragile the soil, the thicker the card, is a good general rule.

A water-based white glue such as Elmer's Glue-All, is preferred for attaching the lichen/soil specimen. Generously coat the base of the soil clump and set on the card, concentrating material in the center. Thick material near the edge of the card interferes with folding the specimen packet. If large amounts of glue are used, it may be necessary to weight the edges of the card to prevent warping. Metal washers, 5-8 cm in circumference, work well for this purpose. Specimens glued to cards should be thoroughly dried before placing in specimen packets.

PACKAGING

To help eliminate breakage of the crust when filed or stacked, strips of styrofoam packing material or small corks (5 x 10 mm) may be glued to the card around the specimen's perimeter. These should be slightly thicker than the mounted specimen so that the surrounding packet rests on them rather than on the specimen. It also helps to buttress the edges of specimens with white glue to prevent breakage from handling or when they become brittle with age. In doing so, avoid gluing the lichen thallus.

Additional protection, if desired, is obtained by covering the specimen with a piece or cotton or gauze cut to the appropriate size. A good source is SOF-ROL cast padding, a Johnson & Johnson product that comes in 4" x 4 yd rolls. This, or other brands of cast padding, can be purchased from medical supply distributors. Quantities of padding may be cut after wrapping around an appropriately sized card.

After all the above steps are completed and the lichens are numbered and identified, it is useful to include certain data such as as the collection number, spore details, chemical tests, and TLC results directly on the card. This data could also be on the outside of the packet. If more than one species occurs within the collection, indicate the selected one named on the label with arrows. Secondary taxa can also be indicated in this fashion and indicated by using "a", "b", etc. This allows cross-referencing of less common species.

In conclusion, it is hoped that well curated soil lichens will encourage lichen students and other scientists to more fully appreciate and know this rich and interesting flora.

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LICHENS OF SOUTHERN MAINE COLLECTED ON THE 1987 ANDREWS FORAY

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The 1987 A. LeRoy Andews Foray organized by Bob Thomas of Bates College met in southern Maine at Camp Chewonki on September 18-20. There was considerable interest in lichens and this rich area yielded 90 species at Morse Mountain, the first stop, and 138 total for both days.

In addition to the large number of species collected there are several items of systematic and biogeographic interest which deserve special comment. We collected a *Cladonia* which on account of its yellow (usnic acid) color, lack of cortex and reticulate cartilaginous layer had to be referred to *C. boryi* Tuck. However, when tested with paraphenylenediamine the tips reacted orange-red. Subsequent TLC demonstrated low levels of fumarprotocetraric acid. A survey of the specimens of *C. boryi* at NY revealed three additional from Maine and one from Newfoundland (annotated by Ahti) with this chemistry. Ahti (1973) surveyed the section *Unciales* and did not find fumarprotocetraric acid. He reported an acid deficient and a psoromic acid strain for *C. boryi*. Recently Ahti (1986) has included a neotropical species with fumarprotoceraric acid in the *Unciales* with considerable reservation. The discovery of a fumarprotocetraric acid strain of *C. boryi* establishes its occurrence in the section. The only collection at NY with psoromic acid is from Rockland County, New York, rather further inland than one would expect *C. boryi* to occur. It is clear that a new study of this species is needed.

Also of interest was the collection by Bill Buck of *Biatorella albidula* (Willey in Tuck.) Zahlbr. Magnusson (1935) in his revision of *Biatorella* De Not. saw only Willey's original material from New Bedford, Massachusetts. As far as I know the species has not been otherwise reported. This is not too surprising as the species is inconspicuous and in fact this collection was made for the accompanying *Candelariella*. The species is easily recognized by the pallid apothecia growing on bark and the multisporous asci with fusiform ascospores, 6-8(-10) x 2 um. Magnusson's description needs to be modified only in that the color of the apothecia varies from whitish to dark greenish brown, apparently depending on exposure to light. *Biatorella* in the sense of Magnusson was very heterogeneous and remains so today even though some species have been removed to *Sarcosagium* Massal. and *Strangospora* Koerber. The asci of *Biatorella albidula* are of the *Lecanora* type with a tholus with a broad cylindrical "masse axiale". This is very different from *Biatorella* s. str. where the asci lack a well defined tholus and the outer layers swell up greatly in KOH. The asci of *Sarcosagium* also lack a tholus and those of Strangospora suggest that it should be placed in the Fuscideaceae. The apothecia of B. albidula have branched and interconnected paraphyses and a poorly developed exciple similar to the apothecia of Scoliciosporum Massal. which is now generally placed in the Lecanoraceae. However, Scoliciosporum differs in ascospore number, shape and arrangement. Since there do not seem to be any other generic names available, it seems reasonable to place Biatorella albidula in a new monotypic genus of Lecanoraceae.

MYRIONORA R. C. Harris, gen. nov.

Genus Lecanoracearum. Thallus crustaceus. Apothecia biatorina. Paraphyses ramosae anastomosantesque. Asci multispori. Ascosporae hyalinae, unicellulares, fusiformes, non halonatae.

Type: Myrionora albidula (Willey in Tuck.) R. C. Harris, comb. nov. Biatora albidula Willey in Tuck., Syn. N. Amer. lich. 2: 130. 1888.

Two other collections are of minor interest. An Usnea collected by Jan Nelson does not seem morphologically separable from U. lapponica Vainio but contains diffractaic acid which is rather far from its normal chemistry of salazinic or norstictic acid. What seems to be Lepraria crassissima (Hue) Lettau was collected on acidic rock in conifer forest. It contains divaricatic acid as the main component but there are several substances which cannot be identified with quick and dirty chromatography. It is rare in North America but apparently more common in Europe where it seems to prefer lime rich rocks. Until both these difficult genera are carefully studied these determinations must be considered provisional.

It was pointed out to us that for flowering plants this area of Maine was the meeting place of a southern coastal element and a northern element. Even with our superficial sample, this seems true for the lichens also. The coast of Maine is one of the few places where the previously confused species, Parmelia saxatilis (L.) Ach. and Parmelia squarrosa Hale overlap significantly. In fact there seems to be a gradient with P. saxatilis slightly more common at Morse Mountain but not collected at the more inland sites. Parmelia saxatilis has a more northern distribution than P. squarrosa and apparently prefers the seashore, moister and cooler in summer. The northern element is also represented by Buellia arnoldii Servít & Nádv., Cladonia carneola (Fr.) Fr., C. maxima (Asah.) Ahti, Coelocaulon muricatum (Ach.) Laundon, and Lecanora grantii Magnusson which are at or near the southern limits of their range. The southern element is less obvious and is definitely represented only by Cladonia atlantica A. Evans. Usnea mutabilis Stirton is probably at its northern limit but distributions in the genus are still poorly known.

Steve Selva, to whom we are greatly indebted for his work on the little known Caliciales, reports that the following are all new reports for southern Maine, Calicium glaucellum Ach., C. parvum Tibell, Chaenotheca ferruginea (Turner ex Sm.) Mig., C. trichialis (Ach.) Th. Fr., Chaenothecopsis debilis (Turner & Borrer ex Sm.) Tibell and Mycocalicium subtile (Pers.) Szat.

At this point the first author would like to preach a sermon and the opinions expressed are entirely his own. It is basically to plead for more support for lichenology in North America. Currently, of the large independent herbaria, only the national herbaria of the United States and Canada support a fulltime lichenologist. Only four major universities and a handful of smaller institutions have lichenologists.

Most institutions of higher learning no longer provide the basic organismic biology which gets students interested but rather directs them toward molecular biology. Thus fields such as lichenology are hit with a double whammy, no students, no jobs for the few who do get interested. This paper and others which I have published in *Evansia* show how even the most casual collecting, as on the Andrews Forays, consistently turns up new information. Even the Northeast which has been collected since the 1800s is still grossly undercollected. I estimate that up to 20% of the lichen species in Eastern North America are still undescribed, including two species of the supposedly well studied genus *Cladonia*. More or less precise North American distributions are known for relatively few species. We are clearly on the verge of a major ecological shift in the eastern forests as stress and pollution begin to, if not destroy, at least greatly modify them. It could provide a great opportunity to study the shifts in the lichens, if only we had some idea of what is there now. We will be in the position of picking up a book in the middle with little or no idea of what went on in the previous chapter. While using lichens for molecular studies is eminently worthwhile, what lichenology and mycology in general need NOW is a major effort for intensive collection. In other groups of plants this phase of development ended many years ago but in lichens our ignorance is still abysmal. Since academia seems to have no interest in supporting this kind of work, I suggest that this is an area in which amateur lichenologists can and should take up the slack. Carefully made collections with good locality data are invaluable resources now and in the future if provisions are made for their eventual deposition in a permanent collection. Support is also needed to create a new generation of lichenologists if extinction or near extinction of the species in North America is to be avoided.

As in previous foray reports the collections available at NY were identified by the first author who then sent around a list asking for additions. Thus the vouchers cited are mainly those at NY. Vouchers for John Guccion's collections are also at NY. Collections by Steve Selva and his students are deposited at The University of Maine at Fort Kent, those of Jan Nelson and Claire Schmitt are in their personal herbaria. Names and author citations follow Egan (1987) except for recent changes, e.g., *Myelochroa* and differences of opinion, e.g., *Baeomyces*.

Bates-Morse Mountain Coastal Research Area. Sagadahoc County, ca. 5 mi S of Phippsburg along Highway 216, 43 40'N, 69 50'E, mixed woods, pitch pine scrub with granite outcrops and back dunes.

Aspicilia cinerea (L.) Koerber - *Harris 20800*.
Bryoria furcellata (Fr.) Brodo & D. Hawksw. - *Harris 20801*.
    trichodes (Michaux) Brodo & D. Hawksw. - *Harris 20802*.
Buellia arnoldii Servít & Nádv. - *Buck 15259*.
    polyspora (Willey in Tuck.) Vainio - *Harris 20803*.
    stillingiana Steiner - *Harris 20804*.
Calicium abietinum Pers. - *Bouchard 5*.
    glaucellum Ach. - *Jalbert 7*, *Selva 3241*, *3242*, *3247*.
    parvum Tibell - *Selva 3242*, *3248*, *3250*.
Cetraria arenaria Kärnef. - *Harris 20805*.
Chaenotheca brunneola (Ach.) Muell. Arg. - *Jalbert 10*, *Selva 3254*, *3255*, *3256*)
    chrysocephala (Turner ex Ach.) Th. Fr. - *Selva 3250*.
    ferruginea (Turner ex Sm.) Mig. - *Selva 3253*.

Cladina arbuscula (Wallr.) Hale & Culb. - Harris 20808.
mitis (Sandst.) Hustich - Harris 20809.
rangiferina (L.) Nyl. - Harris 20810.
stellaris (Opiz) Brodo - Harris 20811.
subtenuis (des Abb.) Hale & Culb. - Harris 20812.
Cladonia atlantica A. Evans - Harris 20813.
bacillaris Nyl. - Schmitt.
boryi Tuck. - Harris 20814.
" " - fumarprotocetraric acid strain - Buck 15262, Harris 20830.
carneola (Fr.) Fr. - Harris 20815.
cenotea (Ach.) Schaerer - Guccion.
crispata (Ach.) Flotow - Harris 20817.
" " " - thamnolic acid strain - Harris 20816.
cristatella Tuck. - Harris 20818.
furcata (Huds.) Schrader - Harris 20819.
grayi G. K. Merr. ex Sandst. - Harris 20820.
macilenta Hoffm. - Harris 20821.
maxima (Asah.) Ahti - Harris 20822.
ochrochlora Floerke - Harris 20823.
pleurota (Floerke) Schaerer - Harris 20824.
scabriuscula (Delise in Duby) Leighton - Harris 20826.
squamosa (Scop.) Hoffm. - Harris 20825.
strepsilis (Ach.) Vainio - Harris 20827.
uncialis (L.) Weber ex Wigg. - Harris 20828.
Coelocaulon muricatum (Ach.) Laundon - Harris 20831.
Dimelaena oreina (Ach.) Norman - gyrophoric acid strain - Harris 20832.
Evernia mesomorpha Nyl. - Harris 20833.
Flavoparmelia caperata (L.) Hale - Guccion.
Foraminella capitata ined. - Harris 20834.
Haematomma elatinum (Ach.) Massal. - Harris 20835.
ochrophaeum (Tuck.) Massal. - Harris 20836.
Hypogymnia physodes (L.) Nyl. - Harris 20837.
tubulosa (Schaerer) Havaas - Harris 20838.
Lasallia papulosa (Ach.) Llano - Harris 20839.
pensylvanica (Hoffm.) Llano - Guccion.
Lecanora caesiorubella Ach. ssp. prolifera (Fink) Harris - Harris 20840.
chlarotera Nyl. - Buck 15244.
grantii Magnusson - Buck 15257.
hybocarpa (Tuck.) Brodo - Harris 20841.
strobilina (Sprengel) Kieffer - Harris 20842.
Lecidea myriocarpoides Nyl. - Harris 20843.
tessellata Floerke - Guccion 114.
Lepraria crassissima (Hue) Lettau - Harris 20844.
zonata Brodo - fumarprotocetraric acid strain - Harris 20845.
Melanelia panniformis (Nyl.) Essl. - Harris 20846.
subaurifera (Nyl.) Essl. - Harris 20847.
Ochrolechia pseudopallescens Brodo ined. - Guccion 127.
Parmelia saxatilis (L.) Ach. - Harris 20848.
squarrosa Hale - Buck 15246.
sulcata Taylor - Harris 20850.
Parmeliopsis aleurites (Ach.) Nyl. - Harris 20851.
placorodia (Ach.) Nyl. - Harris 20852.
Pertusaria trachythallina Erichsen - Harris 20853.
Phaeophyscia rubropulchra (Degel.) Moberg - Schmitt.

Physcia dubia (Hoffm.) Lettau - Buck 15260.
Placynthiella uliginosa (Schrader) Coppins & P. James - Harris 20854.
Platismatia glauca (L.) Culb. & C. Culb. - Harris 20855.
tuckermanii (Oakes) Culb. & C. Culb. - Nelson 747.
Pseudevernia consocians (Vainio) Hale & Culb. - Harris 20857.
Punctelia rudecta (Ach.) Krog - Harris 20858.
Pycnothelia papillaria Dufour - Buck 15271.
Pyxine sorediata (Ach.) Mont. - Schmitt.
Rhizocarpon geographicum (L.) DC. - stictic acid strain - Harris 20859.
Stenocybe major Nyl. ex Koerber - Selva 3245.
Trapeliopsis granulosa (Hoffm.) Lumbsch - Harris 20860.
Tuckermanopsis americana (Sprengel) Hale - Schmitt.
fendleri (Nyl.) Hale - Harris 20807.
Umbilicaria mammulata (Ach.) Tuck.- Harris 20861.
muehlenbergii (Ach.) Tuck. - Harris 20862.
vellea (L.) Ach. - Harris 20863.
Usnea filipendula Stirton - Nelson 746
lapponica Vainio - diffractaic acid - Nelson 744
mutabilis Stirton - Buck 15261B.
strigosa (Ach.) A. Eaton s. lat. - norstictic acid - Harris 20864.
subfloridana Stirton - thamnolic acid - Harris 20865.
" " - squamatic acid - Buck 15261A.
Xanthoparmelia conspersa (Ehrh. ex Ach.) Hale - Harris 20869.
cumberlandia (Gyelnik) Hale- Harris 20866.
taractica (Krempelh.) Hale - Harris 20868.
Xanthoria parietina (L.) Th. Fr. - Buck 15257.

R.P.T. Coffin Wild Flower Sanctuary. Sagadahoc County, Merrymeeting Bay, ca. 6 mi N of Woolwich along Highway 128, 44 01'N, 69 48'E, mixed woods.

Bacidia chlorantha (Tuck.) Fink - Harris 20870.
Buellia arnoldii Servít & Nádv. - Harris 20871.
punctata (Hoffm.) Massal. - Nelson 752.
Calicium glaucellum Ach. - Bouchard 15.
Chaenotheca trichialis (Ach.) Th. Fr. - Kulik 19, Selva 3261.
Cladonia incrassata Floerke - Harris 20873.
Graphis scripta (L.) Ach. - Harris 20875.
Gyalecta truncigena (Ach.) Hepp - Buck 15309B.
Haematomma cismonicum Beltram. - Harris 20876.
elatinum (Ach.) Massal. - Harris 20878.
Lecanora symmictera Nyl. - Harris 20879.
Lecidea helvola (Koerber ex Hellbom) H. Olivier - Buck 15295.
Lepraria finkii (B. de Lesd. in Hue) R. C. Harris - Harris 20880.
Leptogium cyanescens (Rabenh.) Koerber - Buck 15310.
tenuissimum (Dickson) Koerber - Schmitt.
Lobaria pulmonaria (L.) Hoffm. - Buck 15299.
quercizans Michaux - Buck 15302.
Melanelia subaurifera (Nyl.) Essl. - Schmitt.
Micarea prasina Fr. - Harris 20881.
Mycocalicium subtile (Pers.) Szat. - Kulik 19, Selva 3258, 3259.
Parmelia squarrosa Hale - Harris 20882.
Peltigera praetextata (Floerke ex Sommerf.) Zopf - Lowen 350.
Phaeophyscia rubropulchra (Degel.) Moberg - Buck 15309A.
Rinodina subminuta Magnusson - Buck 15309D.
Tuckermanopsis americana (Sprengel) Hale - Harris 20872.
oakesiana (Tuck.) Hale - Buck 15307.

Mud Pond. Kennebec County, near Woodbury Game Sanctuary, ca. 3 mi SW of Litchfield along Highway 126, 44 12'N, 69 58'E, swamp forest and disturbed areas along highway.

Bacidia chlorantha (Tuck.) Fink - *Buck 15324*.
Baeomyces fungoides (Sw.) Ach. - *Harris 20883*.
Buellia disciformis (Fr.) Mudd - *Nelson 750*.
punctata (Hoffm.) Massal. - *Nelson 751*.
stillingiana Steiner - *Harris 20884*.
Calicium parvum Tibell - *Buck 15327*.
Candelariella efflorescens R. C. Harris & Buck - *Buck 15326*.
Chaenothecopsis debilis (Turner & Borrer ex Sm.) Tibell - *Selva 3262*.
Cladonia bacillaris Nyl. - *Harris 20885*.
caespiticia (Pers.) Floerke - *Harris 20886*.
cristatella Tuck. - *Buck 15314*.
grayi G. K. Merr. ex Sandst. - *Buck 15320*.
ochrochlora Floerke - *Harris 20888*.
ramulosa (With.) Laundon - *Buck 15328*.
rei Schaerer - *Harris 20889*.
verticillata (Hoffm.) Schaerer - *Buck 15316*.
Conotrema urceolatum (Ach.) Tuck. - *Nelson 739*.
Cyphelium tigillare (Ach.) Ach. - *Buck 15325*.
Diploschistes scruposus (Schreber) Norman - *Nelson 758*.
Evernia mesomorpha Nyl. - *Buck 15333*.
Flavoparmelia caperata (L.) Hale - *Harris 20890*.
Lecanora hybocarpa (Tuck.) Brodo - *Harris 20891*, *Nelson 759*.
pallida (Schreber) Rabenh. var. *rubescens* Imsh. & Brodo - *Nelson 740*.
pulicaris (Pers.) Ach. - *Buck 15318*.
Lecidea erratica Koerber - *Harris 20892*.
Melanelia subaurifera (Nyl.) Hale - *Harris 20893*.
Mycocalicium subtile (Pers.) Szat. - *Selva 3262*.
Mycoporum compositum (Massal.) R. C. Harris - *Harris 20894*.
Myelochroa galbina (Ach.) Elix & Hale - *Harris 20895*.
Myrionora albidula (Willey in Tuck.) R. C. Harris - *Buck 15330*.
Parmelia squarrosa Hale - *Nelson 755*.
Parmeliopsis aleurites (Ach.) Nyl. - *Buck 15312*.
Peltigera didactyla (With.) Laundon - *Schmitt*.
Phaeocalicium polyporaeum (Nyl.) Tibell - *Buck 15329*.
Platismatia tuckermanii (Oakes) Culb. & C. Culb. - *Buck 15334*.
Porpidia macrocarpa (DC. in Lam. & DC.) Hertel & Schwab - *Harris 20901*
Sarcogyne privigna (Ach.) Massal. - *Harris 20896*.
Stereocaulon pileatum Ach. - *Harris 20897*.
Trapelia involuta (Taylor) Hertel - *Harris 20898*.
Trapeliopsis granulosa (Hoffm.) Lumbsch - *Harris 20899*.
Tuckermanopsis americana (Sprengel) Hale - *Buck 15335*.
orbata (Nyl.) Lai - *Buck 15331*.
Usnea mutabilis Stirton - *Buck 15311*.
Xanthoparmelia conspersa (Ach.) Hale - *Harris 20900*.

Murphys Corner Bog. Sagadahoc County, ca. 3 mi NE of Woolwich, 43 56'N, 69 45'E, bog, swamp forest and roadside.

Bryoria furcellata (Fr.) Brodo & D. Hawksw. - *Nelson 737*.
Cladonia grayi G. K. Merr. ex Sandst. - *Nelson 738*.
Hypogymnia physodes (L.) Nyl. - *Guccion*.
Melanelia subaurifera (Nyl.) Essl. - *Guccion*.
Parmelia sulcata Taylor - *Nelson 753*.
Pertusaria amara (Ach.) Nyl. - *Guccion 117*, *Nelson 734*.
Platismatia tuckermanii (Oakes) Culb. & C. Culb. - *Nelson 733*.
Punctelia rudecta (Ach.) Krog - *Nelson 754*.
Rhizocarpon obscuratum (Ach.) Massal. - *Nelson 760*.
    plicatile (Leighton) A. L. Sm. - *Nelson 761*.
Stereocaulon dactylophyllum Floerke - *Nelson 735*
Trapeliopsis granulosa (Hoffm.) Lumbsch - *Nelson 749*.
Usnea strigosa (Ach.) A. Eaton - norstictic acid strain - *Nelson 736*.

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EVANSIA

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NOTES ON SOUTHERN BRYOPHYTES

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Trichocolea tomentella (Ehrh.) Dum. in Louisiana.--This hepatic was collected in Louisiana in 1938 but remained unidentified until recently. It has apparently not been reported previously for the state. LOUISIANA. Catahoula Parish: Sicily Island, Big Creek, dripping cliff, *Clair A. Brown 7376* (LAF, LSU). Sicily Island is an upland area isolated by the valley of the Ouachita River from similar uplands to the west. Its major drainage is Big Creek, which flows out of the "island" westerly into the Ouachita River, cutting through beds of soft sandstone and exposing modest cliffs along its banks. Although I collected along Big Creek some years ago I did not find *T. tomentella*.

Dichelyma capillaceum (With.) Myr. in Mississippi.--This moss was apparently not reported from Mississippi until its presence there was noted in my book (1984), based on specimens from Amite County in the southwestern part of the state: MISSISSIPPI. Amite Co.: Low woods along the East Fork of the Amite River at Miss. Rte. 24, on tree bases and exposed roots, *Reese 7071, 7074a, 7075, 7082* (LAF). I recently found *D. capillaceum* in abundance further north in Mississippi: Madison Co.: Along the Natchez Trace Parkway at mile 120, at the Cypress Swamp Nature Trail, ca. 22 mi. NE of Jackson, on swollen bases of *Nyssa aquatica* and *Taxodium distichum* in a drying meander slough, *Reese 17330* (LAF). Associated with the *Dichelyma* was an abundance of *Amblystegium riparium* (Hedw.) BSG.

Dicranum flagellare Hedw. in Mississippi.--I recently (1987) reported this moss new to Mississippi on specimens from Grenada County, and now report it from a second locality in the state. Madison Co.: Along the Natchez Trace Parkway at mile 131, ca. 33 mi. NE of Jackson, low, wet, pine-oak-elm forest at a picnic area on N side of road; locally abundant on rotting pine stumps and logs, *Reese 17335* (LAF). This material, like other collections from the southern Coastal Plain, consists of very small plants formerly referred to as var. *minutissimum* Grout, a name now considered to be a synonym of *D. flagellare*.

I thank Florence Givens for making the specimen of *Trichocolea tomentella* available to me.

Reese, W. D. 1984. Mosses of the Gulf South, from the Rio Grande to the Apalachicola. Baton Rouge.

______. 1987. Dicranum flagellare and Fissidens hallianus new to Mississippi. Evansia 4: 41.

MOSSES FROM THE STATE OF MAINE--III

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There have been approximately 376 moss taxa reported from the state of Maine. The Maine counties of Hancock, Lincoln, Oxford and Piscataquis have been most thoroughly collected. Nevertheless, further collecting in these counties may still be profitable in ferreting out unusual elements of the flora. Conversely, mosses from the counties of Aroostook, Franklin, Somerset and Washington have hardly been collected at all. Nearly any moss collected in these four counties will likely as not represent a county record. Those with an interest in mosses from this state can obtain from the author, by request, a referenced county checklist of the mosses reported in the literature from Maine.

The following list of mosses contains one Maine state record (marked by an asterisk) and 90 county records. These mosses were either collected by William R. Buck (and are deposited in NY) or were found in the herbarium of the Missouri Botanical Garden (MO). In all cases their identity has been verified by me.

The nomenclature and taxonomic concepts of the species in this list follow Crum and Anderson (1981) with the exception of Sphagnum which follows Crum (1984).

AMBLYSTEGIACEAE

Amblystegium varium (Hedw.) Lindb.--Somerset Co., *Merello 12* (MO).

Drepanocladus uncinatus (Hedw.) Warnst.--Aroostook Co., *Seymour s.n.* (MO).

BARTRAMIACEAE

Philonotis fontana (Hedw.) Brid.--Kennebec Co., *Merrill 46* (MO).

BRACHYTHECIACEAE

Brachythecium campestre (C. Müll.) B.S.G.--Sagadahoc Co., *Buck 15296* (NY).

Eurhynchium pulchellum (Hedw.) Jenn.--Washington Co., *Stevens 5281* (MO).

Rhynchostegium serrulatum (Hedw.) Jaeg.--Washington Co., *McCleary s.n.* (MO).

CLIMACIACEAE

Climacium dendroides (Hedw.) Web. & Mohr--Sagadahoc Co., *Buck 15300* (NY).

DICRANACEAE

Dicranella heteromalla (Hedw.) Schimp.--Somerset Co., *Merello 10* (MO).

Dicranum montanum Hedw.--Sagadahoc Co., *Buck 15277* (NY).

D. polysetum Sw.--Penobscot Co., *Merrill 12* (MO).

D. scoparium Hedw.--Sagadahoc Co., *Buck 15280* (NY); Somerset Co., *Merello 7* (MO).

Leucobryum glaucum (Hedw.) Ångstr. ex Fr.--Penobscot Co., *Merrill 23* (MO); Sagadahoc Co., *Buck 15270* (NY); Washington Co., *McCleary s.n.* (MO).

Paraleucobryum longifolium (Hedw.) Loeske--Piscataquis Co., *Merrill 13* (MO).

Trematodon ambiguus (Hedw.) Hornsch.--Kennebec Co., *Merrill 7* (MO).

DITRICHACEAE

Ceratodon purpureus (Hedw.) Brid.--Somerset Co., *Merello 11* (MO).

Pleuridium subulatum (Hedw.) Rabenh.--Kennebec Co., *Merrill s.n.* (MO).

FISSIDENTACEAE

Fissidens bryoides Hedw.--Penobscot Co., *Merrill 19b* (MO).

F. dubius P.-Beauv.--Androscoggin Co., *Merrill 22* (MO); Penobscot Co., *Merrill 21* (MO).

F. osmundoides Hedw.--Kennebec Co., *Merrill 20* (MO).

FONTINALACEAE

Fontinalis antipyretica Hedw. var. *antipyretica*--Androscoggin Co., *Merrill 68* (MO).

F. flaccida Ren. & Card.--York Co., *Pier s.n.* (MO).

FUNARIACEAE

Funaria hygrometrica Hedw.--Kennebec Co., *Merrill s.n.* (MO); Washington Co., *McCleary s.n.* (MO).

Physcomitrium pyriforme (Hedw.) Hampe--Kennebec Co., *Merrill s.n.* (MO).

GRIMMIACEAE

Grimmia agassizii (Sull. & Lesq. ex Sull.) Jaeg.--Piscataquis Co., *Merrill 30* (MO).

G. alpicola Hedw.--Penobscot Co., *Merrill 29* (MO).

G. apocarpa Hedw. var. *gracilis* Röhl.--Piscataquis Co., *Merrill 139* (MO).

G. donniana Sm.--Piscataquis Co., *Lowe s.n.* (MO).

Grimmia donniana was first attributed to Piscataquis County by Kennedy and Collins (1901) who collected it near the summit and at the Chimney of Mt. Katahdin. Despite the lack of authentic material for comparison, Collins (1901) considered there to be "very little doubt" as to its identity. In 1926, Lowe re-collected the species at the Abol Slide of Mt. Katahdin where she found the species to be "much in evidence on the rocks in big and little thickly-fruited cushions." However, Crum and Anderson (1981) considered records of the species from Maine in need of confirmation. The Lowe collection in the herbarium at MO, which is *G. donniana*, appears to be a duplicate of the one reported by Lowe (1926).

G. maritima Turn.--Cumberland Co., *Lowe 5438* (MO).

HYLOCOMIACEAE

**Hylocomium pyrenaicum* (Spruce) Lindb.--Franklin Co., *Dunham s.n.* (MO).

Hylocomium pyrenaicum is a widely distributed boreal species known in New England from Vermont and New Hampshire. In the eastern United States the species reaches its southern limit in New York. *Hylocomium pyrenaicum* is best recognized by its abundant paraphyllia and single costa, although the costa at times may be weakly forked.

H. splendens (Hedw.) B.S.G.--Aroostook Co., *Hill 17234* (MO); Franklin Co., *Dunham s.n.* (MO); Penobscot Co., *Merrill 91* (MO).

Pleurozium schreberi (Brid.) Mitt.--Penobscot Co., *Merrill 40* (MO); Sagadahoc Co., *Buck 15279* (NY).

Rhytidiadelphus triquetrus (Hedw.) Warnst.--Aroostook Co., *Hill 17233* (MO).

HYPNACEAE

Callicladium haldanianum (Grev.) Crum--Sagadahoc Co., *Buck 15247* (NY).

Herzogiella turfacea (Lindb.) Iwats.--Kennebec Co., *Merrill 98* (MO).

Hypnum cupressiforme Hedw.--Sagadahoc Co., *Buck 15264* (NY).

H. fertile Sendtn.--Piscataquis Co., *Merrill 136* (MO).

H. imponens Hedw.--Sagadahoc Co., *Buck 15276* (NY); Washington Co., *McCleary s.n.* (MO).

H. lindbergii Mitt.--Franklin Co., *Stevens s.n.* (MO).

H. pallescens (Hedw.) P.-Beauv.--Androscoggin Co., *Merrill 84a* (MO); Penobscot Co., *Merrill 84* (MO); Piscataquis Co., *Dunham s.n.* (MO); Sagadahoc Co., *Buck 15265* (NY).

Isopterygium elegans (Brid.) Lindb.--Sagadahoc Co., *Buck 15292* (NY).

LESKEACEAE

Leskea polycarpa Hedw.--Kennebec Co., *s.coll. & s.n.* (MO); Penobscot Co., *Merrill 112* (MO).

Leskeella nervosa (Brid.) Loeske--Piscataquis Co., *Merrill 114* (MO).

MNIACEAE

Mnium affine var. *rugicum* (Laur.) B.S.G.--Penobscot Co., *Merrill 47* (MO).

M. cuspidatum Hedw.--Oxford Co., *Stevens s.n.* (MO).

M. drummondii Bruch & Schimp.--Oxford Co., *Adams 328* (MO).

M. hornum Hedw.--Hancock Co., *McCleary s.n.* (MO).

M. spinulosum B.S.G.--Androscoggin Co., *Merrill 49* (MO).

NECKERACEAE

Neckera pennata Hedw.--Androscoggin Co., *Merrill 71* (MO); Franklin Co., *Dunham s.n.* (MO); Sagadahoc Co., *Buck 15303* (NY).

ORTHOTRICHACEAE

Orthotrichum sordidum Sull. & Lesq. ex Aust.--Cumberland Co., *Lowe s.n.* (MO); Kennebec Co., *Buck 15317* (NY); Sagadahoc Co., *Buck 15309* (NY).

Ulota coarctata (P.-Beauv.) Hamm.--Sagadahoc Co., *Buck 15308* (NY).

U. crispa (Hedw.) Brid.--Penobscot Co., *Merrill s.n.* (MO); Sagadahoc Co., *Buck 15304* (NY).

U. hutchinsiae (Sm.) Hamm.--Androscoggin Co., *Merrill 41* (MO).

U. phyllantha Brid.--Knox Co., *Chamberlain 5358* (NY).

PLAGIOTHECIACEAE

Plagiothecium cavifolium (Brid.) Iwats.--Androscoggin Co., *Adams s.n.* (MO).

POLYTRICHACEAE

Pogonatum pensilvanicum (Hedw.) P.-Beauv.--Piscataquis Co., *Merrill 137* (MO).

Polytrichum commune Hedw.--Sagadahoc Co., *Buck 15284* (NY).

P. juniperinum Hedw.--Washington Co., *Merello 15* (MO).

P. pallidisetum Funck--Sagadahoc Co., *Buck 15288* (NY); Somerset Co., *Merello 9* (MO).

P. piliferum Hedw.--Lincoln Co., *Allen 6104* (MO); Sagadahoc Co., *Buck 15289* (NY).

POTTIACEAE

Weissia controversa Hedw.--Kennebec Co., *Merrill 8* (MO).

SEMATOPHYLLACEAE

Pylaisiadelpha recurvans (Mx.) Buck--Somerset Co., *Merello 8* (MO).

SPHAGNACEAE

Sphagnum capillifolium (Ehrh.) Hedw.--Washington Co., *McCleary s.n.* (MO).

S. capillifolium var. *tenellum* (Schimp.) Crum--Hancock Co., *Merello 13* (MO); Washington Co., *Merello 19* (MO).

S. recurvum P.-Beauv.--Washington Co., *McCleary s.n.* (MO).

TETRAPHIDACEAE

Tetraphis pellucida Hedw.--Sagadahoc Co., *Buck 15281* (NY).

THUIDIACEAE

Helodium paludosum (Sull.) Aust.--Kennebec Co., *Buck 15323* (NY).

Thuidium delicatulum (Hedw.) B.S.G.--Sagadahoc Co., *Buck 15301* (NY); Washington Co., *McCleary s.n.* (MO).

T. recognitum (Hedw.) Lindb.--Franklin Co., *Dunham s.n.* (MO); Penobscot Co., *Merrill 118* (MO).

I thank William R. Buck for permission to publish his county records of mosses from Maine, and for help tracking down some of the literature on Maine mosses.

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BUELLIA IN NORTH AND CENTRAL FLORIDA
OR
THE VIRTUES AND REWARDS OF COLLECTING

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This work continues a line of thought and to some extent is derived from my two articles in the previous number of Evansia. It is intended to reinforce the idea that lichen collecting is needed due to our very real, perhaps even colossal, ignorance of the lichens of North America. I will use as an exemplar Mr. Edward Wheeler of Nalcrest, Florida, who began collecting and sending me lichens about two years ago. The prime requisites of a good collector seem to me to be the ability to see differences, serendipity and persistence. That Mr. Wheeler possesses serendipity is amply evident from his discovery of Gyalideopsis vainioi, a new species of Buellia and several additional species in other groups which are also probably new to science. His "stick to it" quality is shown by the fact that when he heard about the Gyalideopsis, he went out, not entirely sure what he was looking for, and collected a large amount of material with dark apothecia. He did indeed recollect a half dozen more thalli of the Gyalideopsis, but more relevant here, also a large amount of Buellia. Thinking that this would make good exchange material, I began to sort it. I soon realised that several taxa were present and conceived the idea that some ecological information might be derivable from this material. It is very rarely that such a large, essentially random sample is collected. In higher organisms it is generally accepted that only one species of a genus is going to be found in a given niche. This does not seem to apply to fungi, including lichens, as is shown below. The collections consisted of lengths of twig ca. 2-15 cm long and ca. 0.5-2 cm thick. Presumably such a piece represents a single niche. There were three collections all from Fedhaven, Polk County, mostly on Myrica cerifera. Six taxa of Buellia were present, bahiana (8-spored), bahiana (12-16-spored), curtisii, modesta (including oily hymenium and non-oily hymenium forms), punctata and stillingiana. The polysporous form of Buellia bahiana was kept separate just to get some feel of how it related to the 8-spored form. The first collection (82 thalli) yielded 40% curtisii, 38% bahiana(8), 11% modesta, 8% bahiana(12-16) and 2% stillingiana; the second (23 thalli) 52% bahiana(8), 26% bahiana(12-16), 17% curtisii and 4% modesta and the third (65 thalli), 56% bahaiana(8), 28% modesta, 9% bahiana(12-16), 5% curtisii and 2% punctata. In the three collections there were a total of 47 pieces of twig, one had four of the above taxa, 9 had three taxa, 18 had two taxa and 19 had only one, i.e., 59% of the samples had more than one species of Buellia occupying the same niche. All the Buellia species found, except B. punctata, contain norstictic acid. This raises the question: Does norstictic acid provide some advantage in this niche? Thus another virtue of collecting is that it can provide stimuli to lichen ecology and biology.

Another major virtue is that collections, both large and small, such as Mr. Wheeler's encourage taxonomic revision, if only to find a pigeonhole in the herbarium for them. The remainder of this paper is such a working revision of Buellia in North and Central Florida. As a matter of deliberate policy I have not attempted to examine all type specimens. This is a work of a few weeks for a small region based on a small number of specimens. In recent years it has become all too common for those working on small regional floras to identify their specimens by borrowing the types. I, as a sometime monographer, find this extremely unfortunate. There are several types at Geneva which have been completely "used up", destroyed without the characters needed for their understanding being recorded. Such names then end up as *nomina inquirenda* or excluded species. Major herbaria should give more consideration to conservation of scanty type specimens.

Most of our knowledge of *Buellia* in Florida is from Imshaug's unpublished thesis (1951) and his work on the West Indian species (1955). A few changes were included in the first North American lichen checklist (Hale & Culberson, 1956). Most of the information in the keys and discussion below is original but some is shamelessly borrowed from Imshaug (1951, 1955) and to a lesser extent from Aptroot (1987). They should be consulted to fill in the picture. I have also decided to validate one of Imshaug's *nomina nuda*. Three species which may be better placed in *Rinodina* are included due to lack of algae in the exciple and consequent possible confusion with *Buellia*. I realize that what follows leaves many questions unanswered but it is presented on the old philospophic principle that something is better than nothing.

KEY TO BUELLIA IN NORTH AND CENTRAL FLORIDA

1. Thallus with citrine yellow soredia (KC+ orange) in punctiform to diffuse, confluent soralia; spore wall strongly ornamented; spores 16-19 x 9-11.5 um .... *wheeleri* R. C. Harris
1. Thallus not sorediate 2
    2. Thallus P+ orange-red (fumarprotocetraric acid); spores 13.5-16.5 x 6.5-7.5 um .... *rubifaciens* R. C. Harris
    2. Thallus P- or P+ yellow (norstictic or baeomycesic acid) 3

        3. Spores more than 8 in the ascus 4

            4. Hymenium with abundant oil droplets; spores 12-16 in the ascus; upper hymenium K+ purplish .... *bahiana* Malme
            4. Hymenium without oil droplets; spores 24-32 in the ascus; upper hymenium K- .... *polyspora* (Willey in Tuck.) Vainio

        3. Spores 8 in the ascus 5

            5. Spores 15 um or less in length and mostly 5 um or less in width 6

                6. Thallus containing a bright red pigment; spores 8.5-12 x 4-5.5 um .... *coccinea* (Fée) Aptroot
                6. Thallus unpigmented 7

                    7. Hymenium with abundant oil droplets; spores 9-13 x 4-5 um .... *rappii* Imshaug ined.
                    7. Hymenium without oil droplets 8

                        8. Exciple with strongly differentiated colorless layer (fig. 1); spores 9-12.5 x 4-5 um .... *amphidexia* Imshaug ex R. C. Harris
                        8. Exciple at most paler brown within 9

9. Lichen substances lacking; spores 9-16 x 6-7 um .... *punctata* (Hoffm.) Massal.

9. Lichen substances present (xanthones, atranorin, baeomycesic, barbatic, norstictic acids) 10

10. Atranorin and norstictic acid or atranorin only; exciple paler within; disk naked; spores 10-15 x 5-7 um .... *stillingiana* Steiner

10. Containing other substances; exciple not paler within, concolorous with hypothecium; disk pruinose or not 11

11. Thallus P+ yellow (baeomycesic and squamatic acids); spores 9-13 x 4-5.5 um .... *caloosensis* Tuck.

11. Thallus P- 12

12. Thallus KC- or weakly orangish (lichexanthone and barbatic acid); disk not pruinose; spores 10-12.5 x 4-5.5 um .... *catasema* (Tuck.) Tuck.

12. Thallus KC+ orange (xanthones); disk white pruinose; spores 12-15 x 4.5-6 um ....*pachnidisca* R. C. Harris

5. Spores 15 um or more in length and 5 um or more in width 12

13. Apothecial disk yellow-green pruinose; thallus yellowish (xanthones); spores 19-28 x 8-10 um .... *melanochlora* (Krempelh.) Müll. Arg.

13. Apothecial disk naked 14

14. Spores 4-celled or with inner spore wall thickened, at least at septum 15

15. Norstictic acid present 16

16. Spores becoming 4-celled, 17-21 x 6-8 um ... . *lauricassiae* (Fée) Müll. Arg.

16. Spores 2-celled, 18-22 x 7-8.5(-10) um; spore wall thickened at the septum as in *Caloplaca* .... *curtisii* (Tuck.) Imshaug

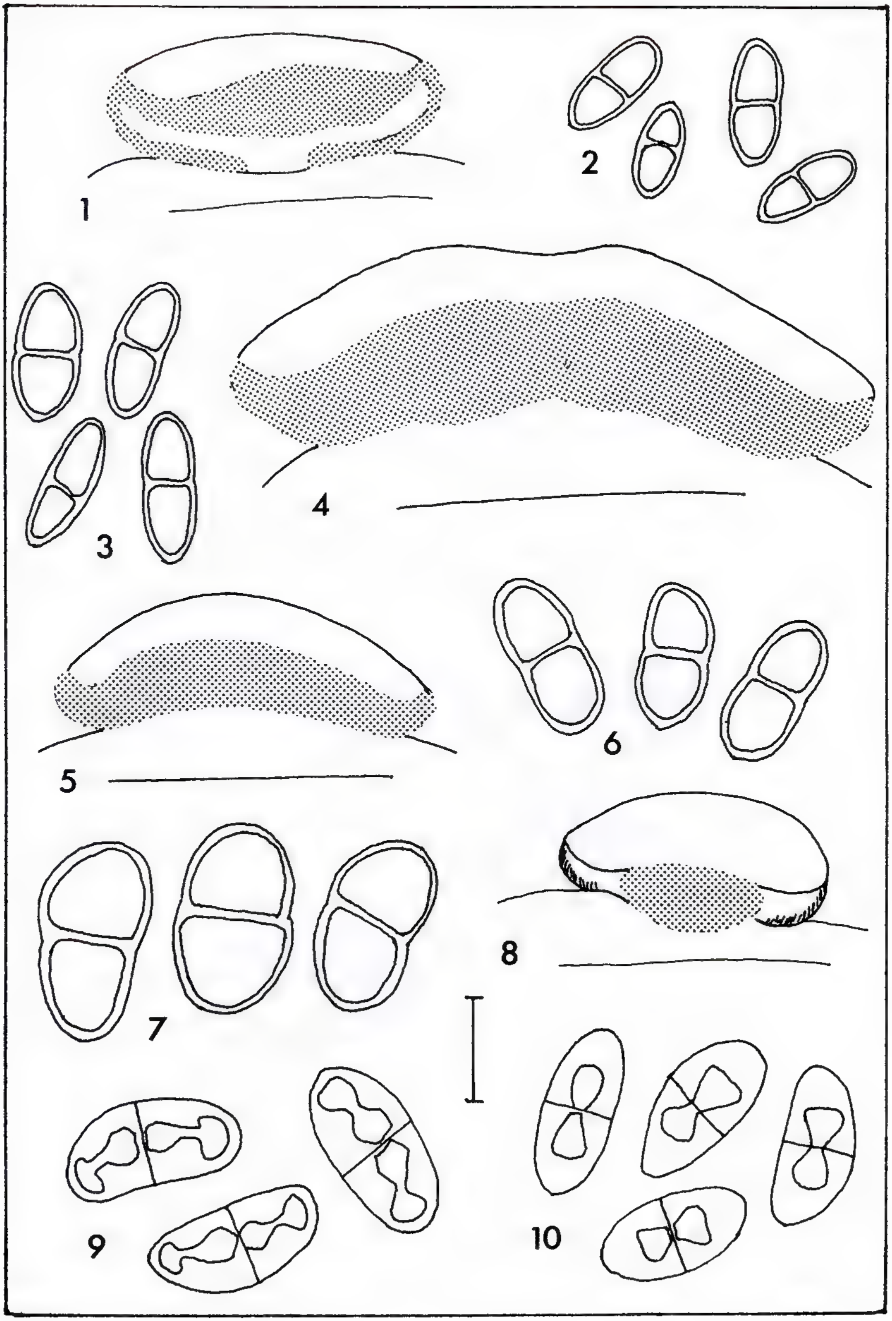
15. Norstictic acid absent 17

17. Spores large, 32-41 x 13-20 um; spore wall thickened partially cutting off terminal cells; hymenium with abundant oil droplets .... *rinodinospora* Riddle

17. Spores less than 20 x 10 um 18

18. Spores as in fig. 9, 17-19 x 7-9 um ... . cf. *placodiomorpha* Vainio

18. Spores of Pachysporaria-type (fig. 10), 15-19 x 7-8 um .... *Rinodina* sp.



14. Spores 2-celled, thin walled 19

19. Norstictic acid absent; spore wall strongly ornamented; spores 14-20 x 8-11 um .... *leucomela* Imshaug
19. Norstictic acid present; spore wall weakly ornamented 20

20. Hymenium without oil droplets or with oil droplets only in the upper part; exciple paler within; spores 16-23 x 6-9 um .... *modesta* (Krempelh.) Müll. Arg.
20. Hymenium with abundant oil droplets throughout; exciple concolorous with hypothecium; spores 14-22 x 6-8 um 21

21. Hymenium greenish above, K+ purplish .... *bahiana* Malme
21. Hymenium brownish above, K- .... *curatellae* Malme

Note: In the descriptions below the underlined figure in the spore sizes is the mean. The Florida distributions include specimens cited by Imshaug (1951), if no problems exist, and those verified by me from FLAS and NY with a few from MICH and are indicated only by a list of counties at the end of the description or discussion.

Buellia amphidexia Imshaug ex R. C. Harris, sp. nov.

Buellia amphidextra Tuck., Syn. N. Amer. lich. 2: 131. 1888, *nom. nud.*; *Buellia amphidexia* Imshaug in Hale & Culb., Castanea 21: 78. 1956, *nom. nud.*

Buellia sporis minoribus, 9-*11.2*-12.5 x 4-*4.6*-5 um et excipulo interne strato hyalino distincto. Type. Florida, *Wilson 55* (FH, holotype, chosen by Imshaug; NY-Higginson, isotype).

Thallus pale gray, continuous to granular areolate, containing atranorin. Apothecia to 0.7 mm, plane with slightly raised margin. Exciple with a distinct colorless layer (fig. 1). Spores 9-*11.2*-12.5 x 4-*4.5*-5 um (fig. 2). Levy, Marion and Seminole.

This species recognized by Imshaug in his thesis but never validated seems easily recognizable and not uncommon in northern Florida and was reported by Imshaug from Alabama. Among the small spored species it is easily recognized by the sharply defined colorless layer in the exciple.

Figs. 1-10. Apothecial cross-sections and spores of *Buellia* and *Rinodina*. 1-2. *B. amphidexia* (isotype, NY). 3-4. *B. pachnidisca* (holotype, FLAS). 5-6. *B. rubifaciens* (holotype, NY). 7-8. *B. wheeleri* (holotype, NY). 9. *B.* cf. *placodiomorpha* (Sarasota County, *McFarlin 195*, FLAS).
10. *Rinodina* sp. (Polk County, *Wheeler*, NY). Scale bar = 10 um for spores, 150 um for apothecia.

Buellia bahiana Malme

Reported from Florida by Imshaug (1955), it is locally common. The polysporous form has not been noted before but does not seem to be worthy of nomenclatural recognition. However, Buellia pleiotera Malme may be a name for it but I have not seen the type. It apparently has the same range as the 8-spored form and as noted above grows intermingled with it. 8/ascus: Alachua, Dade, Franklin, Polk, Seminole, Wakulla. 12-16/ascus: Columbia, Polk, Seminole.

Buellia caloosensis Tuck.

The application of this name is uncertain as I have not examined the type. Most of the material named by Imshaug is B. catasema but also includes this taxon with baeomycesic and squamatic acids and B.pachnidisca. I have adopted it here to avoid describing yet another taxon, possibly unnecessarily. Its chemistry is distinctive and possibly relates it to B. catasema as barbatic, baeomycesic and squamatic acids shift around rather freely. I have verified a specimen from Texas as well as from the Caloosa River and Duval County.

Buellia catasema (Tuck.) Tuck.

Aptroot (1987) as well as Imshaug (1955) unite this taxon with B. coccinea. However, in view of the chemical differences I feel that they should be kept separate pending study of additional material. Buellia catasema contains lichexanthone and barbatic acid while Buellia coccinea contains a xanthone (probably xanthones), a trace of an unknown and the red pigment (chiodectonic acid according to Aptroot, 1987). The thallus may be more finely granular in B. catasema. All Florida collections examined were on Sabal palmetto except one possibly on Quercus: Duval, Lake, Marion, Seminole.

Buellia coccinea (Fée) Aptroot

Immediately distinguishable by the bright red medullary pigment. See B.catasema for separation from that species. Dade, Liberty.

Buellia curatellae Malme

Treated by Imshaug (1951) as B. conspirans (Nyl.) Vainio but replaced by B. curatellae in Hale and Culberson (1956). It differs from B. bahiana in lacking K+ purplish epithecium and possibly in spore type. I am not convinced that the two are distinct. This is another area where further study is needed. Alachua, Columbia, Duval, Monroe, Seminole.

Buellia curtisii (Tuck.) Imshaug

Imshaug's concept included at least two taxa but I restrict it here to the one with spores with a isthmus more or less as in Caloplaca, exciple pale internally and containing atranorin and norstictic acid. Although widely reported I suspect it is confined to the southern Coastal Plain. In addition to Florida I have verified specimens from Alabama and South Carolina. Columbia, Duval, Franklin, Polk, Seminole.

Buellia lauricassiae (Fée) Müll. Arg.

This is immediately recognizable due to the 4-celled spores and production of norstictic acid. Dade, Palm Beach, Seminole.

Buellia leucomela Imshaug

Buellia langloisii Imshaug in Hale & Culb., Castanea 21: 101. 1956, nom. nud.

The strong ornamentation, broad spores and lack of chemistry define this taxon which is apparently more common in Louisiana than Florida. Often on *Taxodium* but also *Melia* and *Quercus*, Duval, Nassau, Polk.

Buellia melanochlora (Krempelh.) Müll. Arg.

It was reported from Florida by Imshaug (1955) but I have not verified any specimen. I suspect it may not be in North or Central Florida but is more southern.

Buellia modesta (Krempelh.) Müll. Arg.

I am using a broad concept here for material previously included in *B. curtisii* but which lacks any spore wall thickening. Most of the material lacks oil droplets in the hymenium but a few have oil in the upper part. Imshaug (1955) also included such specimens in *B. modesta* and some West Indian specimens annotated by him have oil droplets only in the base of the hymenium. Aptroot (1987) gives the spore size as 15-18(-20) x 6-8(-10) um. A Brazilian specimen at NY has spores 16-17.2-19 x 6-6.6-7 um. Florida material has spores 16-19.2-23 x 6-7.3-9 um. Thus the spores in our material seem a little larger than in South American material. It is separated from *B. stillingiana* by larger, more pointed spores but the separation is sometimes difficult. *Buellia modesta* may also differ from *B. curtisii* and *B. stillingiana* in lacking atranorin, but only a very few specimens have been analyzed. Clearly this complex requires additional work. I have no idea how far north this taxon is distributed as I have not tried to revise anything but Florida specimens. Alachua, Polk, Seminole.

Buellia pachnidisca R. C. Harris, sp. nov.

Buellia disco apotheciorum albopruinoso, sporis minoribus, 12-13.7-15 x 4.5-5.3-6 um, et thallo KC+ aurantiaco. Type. Florida. Seminole County: Sanford, on cypress [*Taxodium*], 8 Aug 1930, *Rapp* (FLAS, F30564, holotype; NY, isotype).

Thallus whitish to gray, more or less continuous to granular areolate, K-, C-, KC+ orange (3-4 xanthones). Apothecia to 1.0 mm, plane with slightly raised margin; disk weakly whitish pruinose; exciple brown, confluent and concolorous with the hypothecium (fig. 4); clumps of colorless prismatic crystals forming in exciple in KOH. Spores 12-13.7-15 x 4.5-5.3-6 um (fig. 3); spore wall weakly ornamented.

All the tropical taxa with white pruinose apothecia have much larger spores. The epithet is derived from *pachne*, the Greek equivalent of Latin *pruina*, frost. Two of the three known collections are on *Taxodium*. Franklin, Seminole.

Buellia cf. *placodiomorpha* Vainio

This name is used with hesitation. The spores (fig. 9) do not quite match Imshaug's (1955) stylized drawing, the spore size is a little large and I have seen no comparative material. It probably belongs in *Rinodina* s. lat. but Mayrhofer has not illustrated this spore type. The external appearance and apothecial anatomy are indistinguishable from *B. punctata* suggesting that apothecial characters are highly conservative. Sarasota.

Buellia polyspora (Willey in Tuck.) Vainio

Widespread in eastern North America and reported by Aptroot (1987) from Guyana, this species is weedy and probably fast growing and short-lived as one collection is on *Baccharis*. Alachua, Duval, Lake, Levy, Seminole.

Buellia punctata (Hoffm.) Massal.

Weedy and widespread, this species probably reaches its southern limit in Central Florida. Duval, Polk, Seminole, Volusia.

Buellia rappii Imshaug in Hale & Culb., nom. nud.
Castanea 21: 78. 1956.

I have only seen one very small specimen which fits Imshaug's (1951) description. Without study of more ample material I do not care to validate the name. It is distinct among the small spored taxa by its oily hymenium. Duval, Seminole.

Buellia rinodinospora Riddle
Buellia callispora sensu Imshaug

Mayrhofer (1984) treated this group in *Rinodina* and neotropical material may be called *R. dissa* (Stirton) Mayrh. as Aptroot (1987) has done. However, Mayrhofer considered them distinct and I agree that the spore sizes of Australian and neotropical specimens are different although I do not see the difference in spore ornamentation he mentions. Both populations contain atranorin and diploicin, although one Florida collection contains only atranorin. The oldest name in this group in the neotropics is *Karschia fraudans* Starbäck, but the spore size given in the original description is too small. Therefore, I have fallen back on the next available name which was described as having spores 36-50 x 15-20 um. Mayrhofer is apparently "purifying" *Buellia* by transferring all species which do not have the *Buellia* spore type to *Rinodina*. I am in no position to fault this as I have done something very similar in a forthcoming paper on the Pyrenulaceae. However, I will leave it to others to transfer the species, probably best assigned to a new genus, to *Rinodina*.

Buellia rubifaciens R. C. Harris, sp. nov.

Buelliae catasemae similis sed sporis latioribus, 13.5-*14.9*-16.5 x 6.5-*7.1*-7.5 um, hymenio oleoso et thallo acidum fumarprotocetraricum continenti. Type: Florida. Franklin County: Hardwoods along Owl Creek, Hickory Landing Recreation Area, ca. 2 mi S of Sumatra, 23 May 1976, *Harris 11277* (NY, holotype).

Thallus whitish, granular areolate, becoming crowded and more or less continuous in the center, K-, C-, P+ orange-red (fumarprotocetraric acid). Apothecia to ca. 0.6 mm, plane to slightly swollen with slightly raised margin; exciple concolorous with hypothecium or slighly paler within (fig. 5); hymenium with numerous oil droplets. Spores 13.5-*14.9*-16.5 x 6.5-*7.1*-7.5 um (fig. 6).

Buellia rubifaciens, named for its reaction with paraphenylenediamine, is known only from the type collection. The only other species that I know with fumarprotocetraric acid is *B. dialyta* (Nyl.) Tuck., which has much larger spores. The type collection also contains material of *B. pachnidisca*.

Buellia stillingiana Steiner

This species is easier to recognize in old herbarium specimens in which the hymenium has turned yellowish and large bipyramidal colorless crystals have developed in the exciple. This would seem to separate it from the closely related *B. modesta*. Recent collections must be named by the smaller spores with more rounded ends. I have included a number of specimens which contain only atranorin. My intuition is that they may merit nomenclatural recognition but I do not have the time to investigate further. The Dade County collections are phytogeographically disturbing as I would not have predicted it so far south. Norstictic acid: Dade, Duval, Lake, Polk, Seminole. Atranorin: Clay, Dade, Duval, Levy.

Buellia wheeleri R. C. Harris, sp. nov.

Species distincta sorediis citrinis, KC+ aurantiacis et sporis mediocribus, 16-17.8-19 x 9-10-11.5 um. Type: Florida. Polk County: Bok Tower Gardens, on fallen rotting oak in scrub, 27 Jun 1988, Wheeler (NY, holotype).

Thallus whitish, rimose, with citrine yellow soredia in initially punctiform soralia which enlarge and fuse to form large sorediate patches; soredia KC+ orange (xanthone, possibly arthothelin). Apothecia to ca. 0.5 mm, slightly swollen; margin not raised; outer exciple darker; inner exciple occasionally yellowish; hypothecium light brown (fig. 8). Spores 16-17.8-19 x 9-10-11.5 um (fig. 7); spore wall strongly granular ornamented.

Sorediate species are rare in Buellia. The combination of yellow, KC+ orange soredia and rather large, ornamented spores is very distinctive. The spore type suggests a relationship to B. leucomela. Preliminary chromatography suggests that the xanthone responsible for the KC reaction is arthothelin which is known to occur in the genus. Buellia wheeleri is known only from the type collection. It is worthy of note that Bok Tower Gardens, where it was collected, is dedicated to preserving the sand scrub habitat (Garden 12(1): 20-23. 1988) in which Mr. Wheeler has been turning up many interesting lichens and about which so little is known lichenologically.

Rinodina sp.

This is known from a single thallus collected by Mr. Wheeler in Polk County. Although the apothecial margin lacks algae, it is pale and together with the spore type (fig. 10) suggests placement in Rinodina.

Acknowledgments

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IOWA HEPATIC AND ANTHOCEROTE ADDITIONS

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The latest comprehensive report concerning the bryoflora of Iowa was that of Peck (1978). This not only was a restatement of Conard's 1956 flora but it also included county and state records from publications since that time. Verification of specimens, however, was not undertaken. Since Peck's study, many taxa have been located in various areas of the state and include six new hepatic species for Iowa. Three of these, Riccia austinii Steph., R. dictyospora M. A. Howe and R. hirta (Aust.) Underw., were previously reported in an abstract by Zehr (1988) without collection numbers. This information is presented in the following list of taxa.

Jungermannia fossombronioides Aust., Lophozia longidens (Lindb.) Macoun and Riccia membranacea Gott. & Lindenb. have also been discovered. The R. membranacea specimen was collected by Shimek (s.n.) on September 26, 1920 in Mahaska County on soil along the South Skunk River north of Oskaloosa and later misidentified by Conard as Anthoceros laevis L. The paroicous J. fossombronioides occurred on moist, east-facing sandstone at Lacey-Keosauqua State Park in Van Buren County (SE ¼ sect. 3 of T.68N., R.10W.) while L. longidens was growing on crumbling north-facing sandstone at Steamboat Rock-Tower Rock County Park in Hardin County (SW ¼ sect. 28 of T.86N., R.19W.).

Numerous recent collections representing county records are also included in this report as well as several old collections that were either misidentified or neglected in earlier publications. A total of 116 county records are listed.

All the liverworts and hornworts at the Ada Hayden Herbarium of Iowa State University (ISC) and the simple thalloids, complex thalloids and hornworts from the University of Iowa Herbarium (IA) have been examined. The Jungermanniales cited from IA are from mixed collections of thalloid liverworts and hornworts. Specimens collected by Zehr will eventually be deposited at ISC. Many collections have been obtained throughout the years by the Iowa Lakeside Lab bryophyte and fern classes under the direction of Donald Farrar and are abbreviated I.L.L.C. Nomenclatural authorities follow those of Stotler and Crandall-Stotler (1977).

Future personal collections plus specimens from various public and private herbaria and the remaining leafy liverworts from IA will be presented at a later date. At present, sixty-six native species of hepatics and three species of anthocerotes are found in the state.

Species List

Hepatophyta

Aneura pinguis (L.) Dum.--Chickasaw Co., *I.L.L.C. 85-6-28-1* (ISC); Clay Co., *Leoschke & Pearson s.n.* (ISC); Greene Co., *Zehr 3320*; Guthrie Co., *Zehr 3394*; Jasper Co., *Zehr 2115*; Linn Co., *Broz 154* (IA); Webster Co., *Zehr 2026*.

Blasia pusilla L.--Guthrie Co., *Zehr 3475*; Hardin Co., *Zehr 3230*; Keokuk Co., *Zehr 2120*; Monroe Co., *Zehr 3595*.

Cephalozia lunulifolia (Dum.) Dum.--Guthrie Co., *Zehr 3450*.

Cephaloziella hampeana (Nees) Schiffn.--Guthrie Co., *Zehr 3420*; Polk Co., *Zehr 3283*; Van Buren Co., *Zehr 3689*.

Chiloscyphus pallescens (Ehrh. ex Hoffm.) Dum.--Cass Co., *Conard C52* with *Reboulia hemisphaerica* (IA); Clinton Co., *Zehr 3340*; Guthrie Co., *Zehr 3444*; Jackson Co., *Zehr 2127*; Jasper Co., *Zehr 3581*; Monroe Co., *Zehr 3596*; Van Buren Co., *Zehr 3646*.

Chiloscyphus polyanthos (L.) Corda--Jackson Co., *Zehr 2130*.

Cololejeunea biddlecomiae (Aust.) Evans--Delaware Co., *Shimek s.n.* with *Reboulia hemisphaerica* (IA); Jackson Co., *Zehr 3153*.

Conocephalum conicum (L.) Lindb.--Guthrie Co., *Zehr 3494*; Howard Co., *I.L.L.C. 85-6-28-22* (ISC); Jasper Co., *Zehr 3296*.

Frullania eboracensis Gott.--Audubon Co., *Zehr 3386*; Greene Co., *Zehr 3320*; Scott Co., *Zehr 3349*.

Frullania inflata Gott.--Audubon Co., *Zehr 3387*; Dallas Co., *Zehr 3206, 3314*; Des Moines Co., *Zehr 3648*; Greene Co., *Zehr 3318, 3370*; Guthrie Co., *Zehr 3377, 3414*; Hardin Co., *Zehr 3221, 3227*; Jasper Co., *Zehr 3302*; Keokuk Co., *Zehr 2123*; Lucus Co., *Zehr 3587*; Mahaksa Co., *Zehr 3245*; Monroe Co., *Zehr 3590*; Van Buren Co., *Zehr 3686*.

Jamesoniella autumnalis (DC.) Steph.--Guthrie Co., *Zehr 3354, 3487*.

Jungermannia fossombronioides Aust.--Van Buren Co., *Zehr 3666*.

Jungermannia gracillima Sm.--Polk Co., *Zehr 3279*.

Jungermannia hyalina Lyell--Marion Co., *Conard 7-83* with *Phaeoceros laevis* (IA).

Lepidozia reptans (L.) Dum.--Guthrie Co., *Zehr 3456*.

Lophocolea heterophylla (Schrad.) Dum.--Clinton Co., *Zehr 3341*; Dallas Co., *Zehr 3418*; Greene Co., *Zehr 3316, 3317*; Guthrie Co., *Zehr 3360, 3366*; Monroe Co., *Zehr 3593*; Polk Co., *Zehr 3281*.

Lophocolea minor Nees--Dallas Co., *Zehr 3416, 3424*; Guthrie Co., *Zehr 3353*; Monroe Co., *Zehr 3591*.

Lophozia longidens (Lindb.) Macoun--Hardin Co., *Zehr 3225*.

Mannia fragrans (Balbis) Frye & Clark--Guthrie Co., *Zehr 3352*.

Mannia pilosa (Hornem.) Frye & Clark--Allamakee Co., *Conard s.n.* (IA).

Mannia sibirica (K. Müll.) Frye & Clark--Winneschiek Co., *Savage 1476* (IA).

Mannia triandra (Scop.) Grolle--Jackson Co., *Zehr 3150, 3157*; Johnson Co., *Shimek s.n.* (IA).

Marchantia polymorpha L.--Clinton Co., *Shimek s.n.* (IA); Dallas Co., *Zehr 3575*; Des Moines Co., *Zehr 3647*; Guthrie Co., *Zehr 3479*; Monroe Co., *Zehr 3600*.

Plagiochila porelloides (Torrey ex Nees) Lindenb.--Dallas Co., *Zehr 3415, 3423*; Guthrie Co., *Zehr 3399, 3483*; Humbolt Co., *Wolden s.n.* (ISC); Jackson Co., *Zehr 2132, 2133*; Van Buren Co., *Zehr 3675, 3680*; Webster Co., *Peck 377* (ISC).

Porella platyphylloidea (Schwein.) Lindb.--Clinton Co., *Zehr 3338*.

Preissia quadrata (Scop.) Nees--Howard Co., *I.L.L.C. 85-6-28-9* (ISC); Marion Co., *Hulbary 153* (IA); Van Buren Co., *Shimek 1074* (IA), *Zehr 3705*.

Reboulia hemisphaerica (L.) Raddi--Dallas Co., *Zehr 3416*; Dickinson Co., *Shimek s.n.* (IA); Guthrie Co., *Zehr 3392*; Howard Co., *I.L.L.C. 85-6-28-23*; Jefferson Co., *Shimek 1090* (IA); Monroe Co., *Zehr 3597*; Polk Co., *Zehr 3282*; Scott Co., *Zehr 81, 2004*.

Riccia austinii Steph.--Lyon Co., *I.L.L.C. s.n.* (ISC), *Zehr 2071, 2072, 2073*.

Riccia beyrichiana Hampe ex Lehm.--Grundy Co., *Wittlake 2650* (IA); Johnson Co., *Shimek s.n.* (IA); Marion Co., *Zehr 3256, 3257*.

Riccia dictyospora M. A. Howe--Lyon Co., *Zehr 2074, 3568*.

Riccia fluitans L.--Clinton Co., *Zehr 3346, 3347*; Guthrie Co., *Zehr 3380, 3637*; Henry Co., *Statler s.n.* (IA); Muscatine Co., *Conard s.n.* (IA), *Horton* (Baker et al., 1987); Polk Co., *Zehr 3217, 3263*.

Riccia frostii Aust.--Des Moines Co., *Zehr 3651*; Grundy Co., *Wittlake 2651* (IA); Lee Co., *Zehr 3656*; Marion Co., *Zehr 3252*; Van Buren Co., *Zehr 3687*.

Riccia hirta (Aust.) Underw.--Lyon Co., *Zehr 3567*; Marion Co., *Zehr 3258*.
Riccia membranacea Gott. & Lindenb.--Mahaska Co., *Shimek s.n.* (IA).
Ricciocarpus natans (L.) Corda--Guthrie Co., *Zehr 3371, 3379*; Hancock Co., *Zehr 129*; Marion Co., *Zehr 3253*; Muscatine Co., *Conard s.n.* (IA), *Horton* (Baker et al., 1987).

Anthocerotophyta

Notothylas orbicularis (Schwein.) Sull.--Allamakee Co., *Conard s.n.* (IA).
Phaeoceros laevis (L.) Prosk.--Dallas Co., *Zehr 3419*; Greene Co., *Zehr 3321*; Guthrie Co., *Zehr 3363*; Henry Co., *Statler 6* (IA); Lee Co., *Conard 7-91* (IA); Monroe Co., *Zehr 3607*; Polk Co., *Zehr 3280, 3427*.

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CHANGE OF EDITOR

With this issue of Evansia, I end my term as editor. When Norton Miller asked me to become editor, with shameless flattery, I reluctantly agreed. I let the journal become what its contributors made it, only occasionally soliciting specific articles. Although I have heard some dissatisfaction about the contents, it has always been third-hand. The dissatisfied did not write to me themselves or bother to contribute any articles. Overall, I have been satisfied with Evansia's evolution. Like a father with a teenage son, though, I wish Evansia well, but am glad to no longer have it with me. The new editor, to whom contributions should now be sent is:

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William R. Buck

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